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Sight Saving in 1932

WE review here the past year's organized effort to conserve vision

THROUGHOUT the past year the National Society for the Prevention of Blindness has had evidence that the present economic crisis will have its effect on the eyesight of the future. City and state welfare departments have reduced activities, not because of a diminution of need, or of interest, but because budgets have had to be cut. Never has the necessity for assistance from voluntary agencies to maintain a normal health standard been so great. Dr. Shirley W. Wynne, commissioner of health of New York City, writing recently in the SIGHT-SAVING REVIEW, pointed out the dangers of malnutrition and lowered health standards to the eyesight of the young.

The Society feels that at the present moment it should direct its activities especially toward the maintenance of morale and toward assistance in carrying on conservation of vision projects in needy communities. We must prevent, as much as possible, the closing of sight-saving classes. We must urge, more than ever, the vigilant prophylaxis of babies' sore eyes. We must help safety engineers to secure the necessary appropriations for preventing eye hazards in industry. We must collaborate in every way with all those in the various fields of sight conservation who are struggling along on reduced budgets. Such a program is not inconsistent with the activities of the National Society in the past; many of our projects are co-operative. For convenience, we are presenting the 1932 program according to projects.

Ophthalmia Neonatorum

The problem of the prevention of babies' sore eyes (ophthalmia neonatorum) has by no means reached complete solution, although

the incidence of the disease has been greatly reduced in the past decade. The percentage of children who are blind from this cause, among new admissions to schools for the blind, rose to 7.8 per cent in the past year. While this is an increase of only 0.3 per cent since last year, it is an indication that greater efforts must be made for the use of prophylaxis in the eyes of the newborn. In addition to continued efforts to educate the public on ophthalmia neonatorum —through pamphlets, radio talks and personal interviews—the Society maintained its collaborative relationship with the State and Provincial Health Authorities. It is hoped that with further research a container for the prophylactic will be developed which will prevent chemical decomposition and, at the same time, meet the test of practicality for doctors, health departments and hospitals.

Syphilis

Unfortunately, it is still little known among the general public that early treatment of the syphilitic expectant mother, by removing the danger of transmitting this disease to the unborn child, reduces to a minimum the possibility of blindness or diseased eyes in her child. The Society makes known, as widely as possible, the fact that if the syphilitic patient is not treated the disease may extend to the eyes and cause serious impairment of vision, or blindness. The adult who is afflicted with syphilis can greatly lessen the possibility of eye difficulties if he receives adequate anti-syphilitic treatment. In carrying on its program of public information on this aspect of prevention of blindness, the Society utilizes the media of literature and lectures, and co-operates frequently with social hygiene agencies.

Preschool Vision Testing

Although we are living in an era when society's interest is centered on the care and development of the young, only one preschool child in 25 has the advantage of a vision test before entering school. Feeling that it is of utmost importance that the child be provided with the right start, the Society during the past seven years has developed and demonstrated throughout the United States a technique and equipment which may be used by teachers,

nurses and other non-medical workers for testing the vision of the young child. A survey indicates that one county of every four in the United States is doing some vision testing. Only six states have incorporated it as a part of their prevention of blindness programs. One of the major activities of the Society is to promote universal vision testing of children under school age.

In spite of the fact that there has been no reduction in the requests for demonstrations of preschool vision testing, the Society found it necessary, in the interests of economy, to cut down the number of demonstrations. Only 78 demonstrations were made in 21 cities, as compared with 103 demonstrations in 42 cities during 1931.

Eye Accidents in Child Play

Every year hundreds of children are hurt by playing with firecrackers, fireworks and toy firearms. Scores of them lose their sight or injure their eyes. Some communities have laws regulating the sale of fireworks, but there is great laxity throughout the country in enforcing these laws. While such legislation is necessary, the major responsibility rests with parents and teachers. The Society secured the co-operation of governors, mayors, local safety councils and influential citizens, generally, in its effort to stamp out this menace to childhood. The publication and distribution of our pamphlet, "Eye Accidents in Child Play," crystallized sentiment on this subject and, indeed, resulted in additional and more stringent laws in some cities.

Clinics for Cross-Eyed Children

It seems almost inexcusable that there should be any children left with cross-eyes, when we realize that it is an affliction which usually can be corrected early in life. The cross-eyed child is frequently a behavior problem because he is self-conscious and suffers from a sense of inferiority. Unfortunately, it is popularly believed that cross-eyes can be outgrown. Parents often neglect to have the defect in their children's eyes corrected until too late to avoid the physical or psychic involvements. The Society is striving to inform parents, through popular literature, lectures,

and the newspapers, of the urgency of early treatment for the young cross-eyed child.

During the past year, several communities established clinics for cross-eyed children whose parents cannot afford the long and expensive treatment under the care of a private physician. Several of these clinics are in New York City; one is in Philadelphia; and another is in Cincinnati. While it may be too soon to forecast the success of the work being done in these centers, it is hoped that it will prove an added accomplishment in the program of saving sight.

Eye Health in the School Program

Twenty-six million children throng the schools of the United States. Many of them are accorded the benefits of vision testing, adequate lighting and hygienic surroundings, but millions do not have the advantages of good eye care. Not only must the school child's eyes be protected, but he must learn how to protect them and how to use them properly throughout life. The pamphlet, "Conserving the Sight of School Children," issued by the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, in co-operation with the Society, is informing school officials on this subject; the demand for this pamphlet was so widespread that two large editions have been exhausted. In the face of difficulty in balancing its budget, the Society must, because of the pressing demand, issue a further revised edition early in 1933, and is already engaged in its preparation.

The Society co-operated with the Illuminating Engineering Society and the American Institute of Architects in formulating a new edition of "Standards of School Lighting." It is hoped, through the general dissemination of this information to superintendents and boards of education, that the lighting in schoolrooms will receive more consideration.

In collaboration with the East Harlem Health Center and a school health committee of the New York City schools, a portable, miniature exhibit, illustrating proper lighting in the home, was prepared. This exhibit will be demonstrated, in conjunction with miniature exhibits on other health subjects, in the public schools of

New York City and, later, it will be available to clubs and settlements.

Sight-Saving Classes

There are still 45,000 children in the United States who have such seriously defective vision that they cannot receive their education in the regular classes, but should be in special sight-saving classes. It is gratifying to note that 15 new sight-saving classes were established during 1932, making a total of 413 classes throughout the United States. The Society must continue aggressively to promote the establishment of sight-saving classes; and must assist in keeping in operation those already established, especially since the present economic pressure has forced the reduction of budgets in the municipal and state departments of education.

The *Sight-Saving Class Exchange* is one of the most effective agencies for promoting interest in this phase of our work; it circulates not only among sight-saving class teachers, but among supervisors and directors of special education. Because of the need for retrenchment, the Society had to cut down the number of issues to three in 1932, as compared with four to six issues in previous years.

The Society was instrumental in inaugurating a sight conservation program in Hawaii and, further, in the establishment of the first sight-saving class on the island, which is to open shortly in Waikiki.

Worldwide interest in sight-saving class work was evidenced by the fact that it was the special topic of discussion at the annual meeting of the International Association for Prevention of Blindness, held in Paris, in November. By request, the National Society's delegate presented the latest developments in sight-saving class technique, as well as the observations made during a brief study of some of the European sight-saving classes.

Training Courses for Sight-Saving Class Teachers

To meet the need for specially trained teachers for sight-saving classes, the National Society continued its co-operative activities in promoting courses in various universities. Such training was offered during the past year in the following institutions: Colum-

bia University; University of Cincinnati; University College, University of Chicago; and State Teachers College at Buffalo. Considering the reductions in educational appropriations and the lowered salaries of teachers, the courses were well attended.

Medical Social Service in Eye Clinics

There are many diseases and conditions of the eye which require continual treatment to prevent blindness or further impairment of vision. Such conditions are discouraging to patients, many of whom do not realize the danger of a lapse in treatment. Further, their difficulties call for a social adjustment and the assistance of someone to act as interpreter, between the doctor and the patient, of the many factors involved. Especially is this true among clinic patients, because the physician usually lacks the necessary time and privacy in which to emphasize the importance of regular treatment. The late Dr. George S. Derby, who was one of the Society's directors, felt that the problem in the clinic could be solved by the engagement of a medical social worker for follow-up work. He said, in proposing the employment of medical social eye workers:

"Glaucoma causes one-quarter to one-third of blindness occurring after middle life. If the cases are seen early enough, a considerable amount of blindness may be prevented. Even when seen late, the rate of visual deterioration may be considerably retarded. Because that sight which has been lost cannot be restored to them, and because the age at which glaucoma is generally found is a discouraging period of life, these patients need special help, medically, mentally and spiritually. Unfortunately, the busy clinic doctor has time only for medical aid; the rôle of friend and adviser must fall upon the social service department of the hospital."

As a result of this presentation, a full-time medical social worker was engaged for the glaucoma patients at the Massachusetts Eye and Ear Infirmary. Through the co-operation of the Society, this medical social service program continued for four years. The growth of attendance at the clinic during that period, together with the more diligent application of the patients themselves to their treatments, proved the value of medical social workers in eye hospitals. When, in April, 1932, the Society felt that it had

performed its part in demonstrating the value of this project, the Massachusetts Eye and Ear Infirmary retained the medical social eye worker as part of the permanent staff of the hospital.

Because of the interest aroused by the social service project in the Massachusetts Eye and Ear Infirmary, a course of training for medical social work in eye clinics is now established there. Eight of the students who took the course are filling positions in eye clinics. Another training center for medical social eye workers has been established in St. Louis. The publication of the semi-annual bulletin for medical social workers in eye clinics has been of great service in consolidating the interest of those particularly concerned in this work.

Saving Sight in Industry

Carrying on its campaign for wider knowledge of occupational eye hazards and means of eliminating these hazards, the Society last year supplied industrial posters and literature to universities and vocational schools, state labor departments, industrial journals, insurance companies and trade associations; and to ophthalmologists, teachers, safety engineers and others professionally concerned with industrial accident and health problems. The Society's co-operation with agencies concerned with the general safety movement resulted in the inclusion of a session on "The Eye" in the annual Greater New York Safety Conference.

Summary

In carrying out its program the Society utilized the press, the radio and the speaker's platform, as well as other media of public education. A large amount of publicity was secured in newspapers, magazines, trade journals and many other types of periodicals. Representatives visited 71 cities in 27 states and Hawaii, as well as Austria, Switzerland, Czechoslovakia, France, Germany and England. Prevention of blindness exhibits were loaned to 86 different communities during the year.

The Sight-Saving Review, a quarterly, which has a limited paid subscription list, is used as the Society's official organ. It was found advisable to cut the subscription price from three dollars to two dollars a year, in order that many of those who have been

subscribers can continue to receive the REVIEW on their reduced budgets. An increase in the number of subscribers, because of the reduction in price, is already indicated.

The *Sight-Saving Class Exchange* was published three times during the year and the *News Letter on Sight Conservation* but once, in order further to meet the needs for economy. Two numbers of the medical social service *Bulletin* were circularized, mainly to medical social workers. Other publications consisted of reprints of articles from the SIGHT-SAVING REVIEW which were considered especially appropriate for distribution among special groups.

The film on prevention of blindness which the Society helped to produce was borrowed by 20 communities for their sight conservation programs. In addition, the Society's slides were in constant use by speakers for their health talks.

More and more the Society is being called upon to act as a clearing house for all problems concerning sight conservation. Hundreds of letters are received, asking for information, and it has been necessary to develop a technique in handling the volume of inquiries. While it is impossible to give specific advice to individuals, other than may be contained in our literature, wherever the question is of such a nature as to suggest a particular reply, it is turned over for answering to a medical member of our directorate who volunteers his services. Frequently the Society is able to direct the inquirer to the local agencies best able to meet his needs.

The Society believes it has reached a high level of accomplishment in a depression year, when every economy was required. It is grateful for the continued interest of its supporters—both those contributing money and those participating in the work. Never has the need been so great as at the present time.

The Challenge of Ophthalmologic Problems—Do We Meet Them?

Philip A. Halper, M.D., F.A.C.S.

THE author points out that the inside of the eye gives the key to the diagnosis of various constitutional disorders

THE struggle for survival demands the complete co-ordination of all the faculties and especially the perfect functioning of the special sense organs. This is particularly true in the scheme of life below that of man, and were it not for the profound feelings of sympathy which are developed in man, humans with handicaps of sight and hearing, and other deformities, would fall by the wayside, as do their less fortunate friends in the animal kingdom.

Life to the individual with the capacity for finer appreciation of his environment means more than mere sustenance, and so we have schools, teachers and societies to develop the faculties of the handicapped so that they not only surmount the rigors of existence and attain material security, but also develop their other functioning senses enough to enjoy color, sound or other delights of their environment.

In so-called normal times, with all the assistance received from municipalities and organizations, the burdens of the handicapped are severe enough. Now, when the governments of the world are in the throes of ill health, threatened on all sides with calamitous changes, the handicapped child, the blind, the deafened, the crippled, are easily overlooked. Budgets are reduced, funds from subscriptions are unavailable, and so the first to suffer are those whose very existence depends on the generosity and sympathy of their fellow men. How quickly in our absorption with our own problems do we disregard the needs of the handicapped. When we look into their future it seems dark indeed. It is necessary for

physicians to prevent as much as possible those conditions which can be prevented. The public must be so educated in problems that lend themselves to correction that the individual from infancy to maturity will be given every opportunity to develop his senses sufficiently to take his place in the great struggle for survival, assisted by his greatest possessions, the special sense organs. Of all these, sight is the most vital.

There are many problems concerning defective vision, specific eye inflammations and blindness in the preschool age. These must be dealt with radically and quickly, for in some instances life itself is in the balance. In the period from five through puberty and adolescence the ocular disorders, though not an immediate menace to life, often assume great importance later on as far as social and vocational handicaps are concerned.

Ophthalmia Neonatorum

The prevention of ophthalmia neonatorum following the infant's safe journey through the birth canal brings to mind the name of the illustrious Credé. He gave to the world one of its greatest blessings when he introduced his prophylactic treatment against ophthalmia neonatorum: the instillation of one per cent silver nitrate, or other solutions of a similar nature, into the eyes of the newborn. Up to that time, in his own clinic in Leipzig, he had an average of over ten per cent of cases of gonorrheal ophthalmia in the whole number of newborns, and since a large percentage of infants were born outside the institutions and were affected with gonorrhea, the percentage of infections mounted in appalling numbers. That the prophylaxis which Credé introduced is effective is shown by the fact that after its introduction the figures in his own clinic dropped to one per cent and the same results were noted the world over.

Ophthalmia neonatorum makes its appearance about the third day after birth. As the child's head passes through the vaginal tract the eyelids are covered with secretions which penetrate quickly into the conjunctival sac. The lids become swollen and there is a profuse purulent discharge. Most of the infection is in the lining of the eyelid, the cornea, or covering of the eyeball, being quite resistant. Only when the cornea is injured does ulceration

develop, therefore treatment must be gently and carefully undertaken so as not to damage the cornea. The slightest abrasion of the latter with a cotton applicator, an irrigating tip or instrument, leads to disaster, and even under the strictest control and excellent care many of these eyes are lost. An important point to bear in mind is the fact that even though prophylactic treatment has been used the baby may subsequently develop gonorrheal ophthalmia a week or two after birth, because of contamination from an infected nurse or mother who is careless in caring for herself while harboring a Neisserian infection.

We occasionally see gonorrheal conjunctivitis in an adult. If the eye contamination occurs when the patient has his urethritis for the first time, the eye affection is quite malignant. However, if it occurs in the course of a recurrent urethritis, after the patient has developed some immunity to the disease, the eye complication is relatively benign, provided, of course, that the cornea remains uninjured. On virgin soil the virulence of a gonorrheal contamination is without equal.

There are several states in the Union in which the Credé prophylactic treatment is not compulsory, and the reason that gonorrheal blindness does not appear in greater numbers in those states is because the medical schools universally teach this very wise procedure.

Dacryostenosis—The Stricture or Narrowing of the Tear Duct

Another type of conjunctivitis, often found in a baby, is a very resistant form. In spite of the countless remedies used, the baby continues to have pus in the corners of the eyes, together with an abnormal amount of tears. In these cases one usually is dealing with a constricted tear duct and an infected tear sac. Especially is this true if the condition is unilateral. The tear duct is formed by an extension down from the sac and a continuation up from the nose. At a point where the two channels meet, the thin diaphragm, composed of several layers of cells, sometimes fails to break down and the naso-lacrimal duct remains obstructed. The tear sac soon becomes infected, causing a chronic conjunctivitis. By exerting pressure over the tear sac one can express a considerable amount of muco-pus through the entrance to the tear sac. At times pressure

over a filled sac may be sufficient to cause the thin diaphragm to give way and the duct becomes continuous. However, it is usually necessary to insert a lacrimal probe and break through the layer of cells which obstructs the canal, after which the troublesome condition quickly disappears.

Cataract

There is quite a variety of congenital cataracts, and the classification follows the location of the lens opacities. Complete cataracts seen at birth are due to developmental disturbances or to intra-uterine ocular inflammation. In the acquired forms, which are, as a rule, bilateral, there is a history of convulsions. These children show signs of tetany and rickets. Another type of cataract that one sees in children is due to injury, either from a perforating wound of the lens capsule or from a contusion of the eyeball. Cataracts that are complete, whether congenital or acquired, should be operated upon as early as possible, for we know that when the retina is unstimulated its development is arrested, with resultant poor vision. The operation of discission, or needling, can be performed in the first few months of life.

Avitaminosis—Vitamin Deficiency

Much has been written of late about vitamins, and the relationship that exists between dietary deficiencies and certain diseases is recognized. Without going too deeply into the problem, suffice it to say that a lack of vitamin A in the diet will produce certain eye changes. It is well known that the retina as well as the liver stores vitamin A. Since the newborn infant's liver contains little or no vitamin A, it is essential that the mother be given a generous supply of this vitamin during the prenatal and lactation periods. Vitamin A is derived from milk, butter, cream, egg yolk, cheese, liver, kidneys, cod liver oil, carrots, cabbage, spinach, tomato, bananas and turnip greens. The most common eye disorders due to deficiencies of vitamin A in the diet are nyctalopia, or night blindness, xerophthalmia, xerosis, and keratomalacia, all of which have to do with changes in the epithelial covering of the eyeball and lining of the para-ocular glands.

Tumors

Intra-ocular tumors are rare; they may be primary or they may have spread from another part of the body. The malignant growth found only in childhood, and usually under five years of age, is glioma—malignant tumor—of the retina. It may occur occasionally in successive children in the same family. We recognize three stages in the symptomatology of such tumors of the retina. In the first stage the inflammatory symptoms are absent and one sees a yellow reflex through the usually dilated pupil, which has been called amaurotic cat's eye—amaurotic because the eye is blind, and cat's eye because it shines in the dark. The second stage is inflammatory: the eye becomes irritated, painful, and there is an increase in tension. In the third stage the tumor has broken through the eyeball, finding its way along the optic nerve to the brain, and through the cornea, involving all the neighboring structures. The eye now becomes transformed into a large ulcerated painful mass which fills the whole orbit. Death occurs from intracranial involvement. Metastases are uncommon. In contrast with sarcoma, which spreads to other parts of the body early but remains localized for some time, glioma extends along the optic nerve to the brain rather early but metastasizes very late.

Squint—Cross-Eyes

To fix more firmly in one's mind the reason for certain procedures in the treatment of squint it will be profitable to review several of the fundamental factors pertaining to vision. In the lower forms of life the eyes are placed laterally and there is complete decussation of the optic nerves; central or detailed vision is lacking. Animals, therefore, rely on the other senses in order to survive, for having no binocular vision their sense of distance and depth perception, together with the clearness of the object, is missing. Besides, laterally projected vision makes for some protection since an animal can more readily see a moving object at its sides than if the eyes were in the frontal plane. Although lateral sight, as far as protection was concerned, became less necessary as man emerged from the jungle, his social and intellectual make-up, as civilization progressed, forced upon him the need for acute vision. Tilling the soil, making implements and secure habitation for protection from the elements

and beasts with which he was surrounded, and the development of a language with its signs and symbols, all participated in the evolution of the macula, which is the area of direct or acute vision. Man's visual needs grew as he continued upward in the social and intellectual order of things. With intelligent appreciation of his environment and of his development of the arts and culture, the evolution of the eye—laterally placed in the lower forms of life for protection, to the frontally placed human eye for acute vision, binocular in character, with its depth perception and finer differentiation—can be more critically evaluated. In the history of the race, macular or central vision is a relatively late acquisition.

The chief element in perfect binocular vision is fusion—the ability to fuse two corresponding retinal images into one—and our eyes are so placed in the frontal plane that rays of light entering them fall upon corresponding parts of each retina. Binocular vision is also a relatively late racial acquisition and is therefore a function that is easily upset. It is only when there is a great inequality of vision that squint appears, either in or out, according to whether the case is farsighted or nearsighted. It is believed that squint is due to a loss of the fusion faculty. When images are unlike and unfit for combination, the eyes adjust themselves by disregarding the poorer image and so one eye, namely, the better seeing eye, is used almost exclusively. The poorer eye deviates and squint therefore is a way out of a difficulty. This is accomplished by turning the poorer eye so that the image received by its macula in the new position is out of focus and blurred. Double sight, or diplopia, results when non-identical areas in each retina are stimulated and the child quickly learns to suppress the false image. Therefore, in the usual squint case, excepting paralytic or alternating squint, one eye has much less acute vision than the other. The squinting eye in hyperopes (farsighted) usually turns in, since the adductor muscles are much stronger than the abductors. In myopia (nearsightedness), however, the squint is divergent since the adductors are quite weak. Children as a rule are born farsighted, and when they are very farsighted, much accommodation must be brought into play in order to see clearly, especially for near vision. We know that convergence is so intimately associated with accommodation that these children who

have a non-stabile fusion faculty are unable to control the strained convergence in excessive accommodation and so the eyes cross over. In other words, the excessive accommodation causes an overbalance of the convergence. A word of caution here: one must not confuse squint with a seemingly turned-in eye in a child with a marked epicanthus—folding of the skin covering the inner angle of the slit between the eyelids.

The treatment of squint follows according to the type with which one has to deal. When one eye has poor vision, perhaps due to an abnormal amount of astigmatism, refraction under atropine cycloplegia with prescribing of glasses will often suffice. For the paralytic type of squint, prisms and surgery, after the lapse of at least a year, may be necessary. For the alternating type of squint with high hyperopia, refraction under atropine cycloplegia with prescribing of glasses is the proper procedure. This will correct the excessive accommodation and will release the strained convergence. Then, too, one must resort to fusion training with the stereoscope or amblyoscope. When glasses and orthoptic training fail to produce the necessary result, surgery is resorted to and its successes lie not only in the improvement of the appearance of the child, but in the fact that the eyes early are given an opportunity to function properly by developing the fusion.

> Emphasizing in the problem of squint the vital fact that the macula with its acute vision is never fully developed at birth but reaches its complete development as the child grows to about the age of seven years, one must appreciate the great need of having these little eyes examined and treated early, for the growing eye turned either in or out fails to develop its macula, fails to attain maximum vision, and the child has been robbed of its binocular acute vision with depth perception and appreciation. Infants tolerate glasses remarkably well and they can be prescribed for babies a year old.

Refraction

In the subject of refraction, the problems of eyestrain and poor vision present themselves. These symptoms may be due to farsightedness, nearsightedness or astigmatism. Farsighted people

and those with astigmatism have the symptoms of headache, eyestrain, etc., which come on, as a rule, about midday and are aggravated as the eyes are used. Not always does 20/20 vision mean normal vision, or emmetropia, for the patient may be accommodating even for distance. The myope sees poorly in the distance, has a weak accommodation mechanism and has no symptoms other than poor vision. Salient points to remember regarding the eye are as follows: (1) Children as a rule are born hyperopic. (2) The hyperopic eye tends to improve with advancing school age. (3) The myopic eye tends to grow worse with advancing school age. Both types should wear glasses—the farsighted individual to be relieved of symptoms and the nearsighted person to be given normal vision. The latter should always be fully corrected so as to prevent as much as possible the increasing myopia as the eyeball is growing. Myopia as a rule comes to a standstill when maturity or full growth is attained. The ophthalmologist's feelings regarding the wearing of glasses must be definite. The usual young hyperope should never be fully corrected and one should give only enough correction to relieve symptoms, just as one would prescribe any other form of medication. It should be a pleasure to take glasses away from a patient when they are not absolutely indicated even though the patient may have worn them for several years.

Interstitial Keratitis

During the school and adolescent years, one sees most of the cases of interstitial keratitis. The points to remember about the disease are as follows: (1) The etiology is, as a rule, inherited syphilis. (2) Though it affects the children of syphilitic parents, it does not pass to the next generation. (3) It usually affects both eyes, though there may be an interval of months or years between the involvement of one eye and the other. The eyes, as a rule, are attacked in succession rather than both at once. (4) Though the symptoms might be severe there is no corneal ulceration. (5) The prognosis is unfavorable regarding the duration; sometimes the disease drags on for months or years, but the ultimate outcome is, as a rule, favorable because in the greater number of cases good vision finally returns.

Relation of Eye to General Disorders

To the man who studies the inside of the eye faithfully, the ophthalmoscope gives the key to the diagnosis of various constitutional disorders and furnishes him with indications for treatment, besides enhancing his judgment regarding prognosis. In no other part of the body can the physician observe directly the internal anatomic structures which the eye presents, such as the nerves, blood vessels, media, etc., or the pathologic processes, such as hemorrhage, exudation, atrophy and edema. Since the eye is so sensitive to systemic disorders, it reflects directly the manifestations of active general inflammatory processes. In studying fundi, or the posterior part of the eye, one is impressed early with the many normal variations which one sees, and before one can correctly interpret a fundus picture, he must have considerable training in ophthalmoscopy. The more one examines fundi, the greater will be his ability to differentiate the normal from the abnormal. In order to pass judgment accurately, the pupil should be dilated so that the periphery of the fundus can be easily visible.

One reaps in proportion as one sows. The fruits which one gathers depend for their richness in flavor upon the soil which nurtures them, and on the tender care with which the wise gardener cultivates and protects his plants. In our attempts to help the child overcome a handicap and to prevent his becoming dependent upon a society that is forever changing, we find not only a positive satisfaction in our efforts but, in the end, the most satisfying fruits of our toil—his self-reliance and independence.

History and Development of Sight-Saving Classes in the United States*

Winifred Hathaway

CHILDREN with seriously defective vision may be changed from potential liabilities to the State into actual assets, when special school facilities and special teaching methods are provided for their education

INTO the foundation of any great building, whether it be an actual architectural structure, a progressive movement or a cause, are woven the thoughts and ideals of thinkers living in advance of their times. Those in the United States interested in the development of special educational advantages for partially seeing children are ever mindful of the fact that, away back in 1802, Franz von Gaheis of Austria not only recognized the need of special education for this group, but suggested definite ways in which such opportunity might be offered. As far as is known, he was the first to recognize that partially seeing children were quite as much misfits in schools for the blind as in those for the normally seeing. Later, Maddox and Bell, in England, came to the same realization and laid the foundation of the schools for myopes in that country, the actual establishment of which was due to James Kerr and Bishop Harman. In 1907 Levinson called attention to the necessity for special schools in Germany. So far as is known, the first classes were established in England in 1908. Strasbourg established classes in 1911.

It was from these myope schools that the United States received its direct inspiration. History repeats itself. Over a hundred years after the recognition by von Gaheis of the undesirability of

* Presented at the annual meeting of the International Association for Prevention of Blindness, Paris, November 19, 1932.

attempting to educate partially seeing children with those who were blind, Edward E. Allen, superintendent of Perkins Institution for the Blind, in the United States, came to the same conclusion through actual experience in his own school. On a visit to England, in 1909, he learned of the myope schools recently established there and, after studying their methods of carrying on the work, felt that he had found a solution for his own problem.

It took considerable time to convince educational authorities in the United States that special opportunities were necessary for partially seeing children, but due chiefly to Dr. Allen's efforts, a class was established in Boston, Massachusetts, in April, 1913. In September of that year, through the efforts of Mr. Robert B. Irwin, a second class was established in Cleveland, Ohio. From these two classes have developed the 409 classes in existence in the United States in September, 1932, representing 118 cities and 22 states.

These classes are now so generally accepted as a part of the educational system that the period of fundamental experiment may be said to be of the past. But it must always be borne in mind that every class, of whatever type, should be a laboratory out of which may evolve things of greater worth. In this sense, classes for partially seeing children will always be experimental; in the methods presented in this paper for administering and teaching such classes, there is no assumption that what has been decided upon as best for today's needs may be considered desirable to meet the changing attitude of tomorrow.

Nomenclature

Probably a phase in the attitude toward this type of education may be noted in the change of name. Since the classes in the United States from the beginning offered opportunity not only to myopes but to those suffering from other types of eye difficulties, the British appellation of "myope school" was inapplicable. The first classes were known as "classes for the partially blind." The term, however, was soon abandoned, since it laid emphasis on the negative side. A special effort was being made at that time for conservation of natural resources, hence the term "conservation" was in very general use. Thus the classes for partially seeing

children came to be known as "conservation of vision classes." This was later discarded in favor of a simpler term, "sight-saving classes." These classes have come to be recognized as a very important part of a national movement for conserving sight and preventing blindness, a movement quite separate from welfare work for the blind and also separate from the education of blind children.

Candidates for Sight-Saving Classes

The first step, for any community considering the establishment of sight-saving classes, is to determine which pupils are candidates and whether there are in the community enough children to warrant the establishment of a class. In the United States each state has the right to make its own educational laws; hence, so varied are the standards in different communities regarding the partially seeing child, that one eligible for a sight-saving class in one state may be ineligible in another. Many efforts have been made to reach common ground. This, however, is the more difficult because of the nature of the problem. Two children having the same degree of low visual acuity may react quite differently to visual impressions. One may be able, through experience, so to interpret his visual impressions—however indistinct these may be—that he can carry on his work in a sight-saving class; the other, through lack of such ability to interpret, may have to use the sense of touch as his chief avenue of educational approach.

The great stumbling block, however, is the question of myopia. So diverse are the opinions among ophthalmologists regarding this eye difficulty, that the educator is quite at a loss to know whether a child with myopia should or should not attend the sight-saving class. Since the decision of candidacy must, therefore, rest with the ophthalmologist and be considered an individual problem, the school physician and general practitioner are concerned to know which children should be routed to him for this final decision.

At the University of Chicago a meeting of ophthalmologists and educators was called to suggest guides for routing children to ophthalmologists. The following broad program was decided upon:

1. General statement: Children having a visual acuity of 20/70

(6/21) or less in the better eye after proper refraction. In addition, the following are recommended as potential candidates:

A. Children in elementary schools having four or more diopters of myopia.

B. Inactive, subsiding (or regressive) cases, such as interstitial or phlyctenular keratitis, optic neuritis, trachoma, etc., in which some irritation may be present, provided the approval of the attending physician is given.

2. All cases must be considered individually.

3. Any child who in the opinion of the ophthalmologist would benefit by assignment to a sight-saving class, subject to suggestion for treatment and training by such ophthalmologist, and the acceptance of the educational authorities having charge of such classes.

4. It is assumed that all the children assigned to sight-saving classes have average normal mentality.

Since children with a visual acuity of less than 20/200 (6/60) will, in all probability, be unable to use sight-saving class equipment, they are recommended for Braille work.

Proportion of Children Requiring the Advantages of a Sight-Saving Class

In the United States, the most conservative estimate of the proportion of children requiring the advantages of a sight-saving class is one in a thousand of the school population. However, in those states and cities that have most fully developed this type of education, the proportion more nearly approximates one in five hundred of the school population.

Ophthalmological Care

Educational authorities must necessarily take care of the routine placement of children with seriously defective vision. But it becomes the duty of the ophthalmologist not only to decide upon the candidacy of pupils and, if glasses are necessary, to check up on the prescription, but to see that records are prepared and that copies of these are made available to the educational authorities, so that teachers may be conversant with the type of eye difficulty

with which they may have to deal. Such records state the time of the next examination and make recommendations for the amount of close eye work. In many cases, in addition to the work already mentioned, ophthalmologists visit sight-saving classrooms from time to time to see the actual conditions under which the children are working and to assist the teacher in carrying out instructions.

In the United States ophthalmological care is provided in various ways: private physicians, ophthalmologists of the board of education or the board of health, and private agencies.

Administration

When candidates have been decided upon and the need for a class demonstrated, consideration is given to the selection of a school building. Since children eligible for sight-saving classes are social beings, great thought is given to see that they have the opportunity of mingling, as much as possible, with their normally seeing companions. It is felt that segregating them in a group by themselves without such opportunity for contact may add another handicap—that of social disability.

Hence, by the method pursued in 90 per cent of the classes in the United States, these children are placed in special sight-saving classrooms where, under the direction of a trained teacher who follows the recommendations of the ophthalmologist, they take all work requiring close use of the eyes. They join their normally seeing companions for oral work, rote singing, music appreciation, dramatic work, and other activities that are decided upon in a co-operative program.

The proportion of children needing this type of education is so small, in comparison with the general school population, that one class must, of necessity, serve a district or community. For this reason, children of several grades or standards will be found in the one group. It is essential for the success of the class that a school be selected having the same grades or standards as those represented in the sight-saving class. Since some children have to travel a great distance to reach the sight-saving class, the school selected is as centrally located as possible.

Lighting, Decoration of Room, and General Equipment

It is evident that if a modern building can be selected there will probably be little necessity for remodeling, since decoration and lighting of most of the new school buildings much more nearly approximate the ideal for normally seeing children than in the past. In this particular, what is ideal for normally seeing children is likewise ideal for the partially seeing.

Natural Lighting.—Unilateral natural lighting, to the left of the pupils, is desirable, with glass area at least one-fifth—preferably one-fourth—of the floor area. Since the best light comes from the top of the window, the glass area reaches within six inches of the ceiling and the bastions between windows are as narrow as possible to prevent shadows. In order to prevent glare in the eyes of the children and on blackboards, windows are not placed nearer to the blackboards than seven feet. Surroundings likely to cause glare, such as whitewashed buildings, glass roofs, etc., are avoided. In temperate latitudes, east or west, or northeast or northwest exposures are usually selected, since these give a maximum of light with a minimum of glare. The natural light is controlled by two buff colored, translucent shades, placed on rollers near the center of the window so that one may be pulled up and the other down. Shades are made wide enough to avoid streaks of light at the side, and care is taken to see that there is no unprotected space between the rollers.

Artificial Lighting.—In the early classes in the United States artificial lighting was thought to be unnecessary, since it was planned that only oral work would be undertaken on days when the natural light failed to give sufficient illumination for eye work. It was soon discovered, however, that children would use their eyes. In a mixed group of four or five grades or standards, subjects that could be presented orally to the younger children were of little interest to the older ones. Plans were developed, therefore, to make available artificial lighting meeting the same requirements as natural lighting—sufficient illumination for the type of work to be accomplished, well diffused, well distributed and without glare. By no means do all the sight-saving classes in the United States approximate this ideal.

Walls, Ceilings, Woodwork.—The color of walls is determined somewhat by the climate. In temperate zones, light buff walls with white or cream ceilings have proved most satisfactory; they are not only cheerful but, what is of great importance, have an excellent reflecting value. A neutral tone of woodwork is used. In order to reduce glare to a minimum, all surfaces—walls, woodwork and ceilings—are in flat finish.

Furniture.—Rooms are equipped with a teacher's desk and chair and with adjustable, comfortable, hygienic seats and desks that lift to an angle, all in dull finish. It will be necessary to add closets large enough to hold material of greater proportions than that used in regular grades, a long table and chairs for handwork, and, in classrooms intended for young children, kindergarten tables and chairs, a sand table for project work, and one or two easels.

Blackboards.—Blackboards are, as far as possible, of good slate and are kept in condition by frequent cleaning and by refinishing when necessary. Blackboards in three parts, each of which may be pushed up or down, make it possible for the pupils to keep work on a level with their eyes.

The arrangements thus far mentioned as necessary for sight-saving class pupils differ little from those for the normally seeing.

Reading Material.—The procedure in the education of partially seeing children in the United States had to be developed by the trial and error method. It was soon discovered that, given sight, no matter how poor this might be, children would read. In consequence, some method had to be devised by which they could read with the least possible eye fatigue.

For very young children there were in existence large reading charts with clear, distinct letters. But for children even slightly more advanced, no material was available. Handmade charts came into use, printed with rubber stamp letters of large size. This proved not only most laborious work for teachers and pupils, but it was found that, even when the printing was done with painstaking care, the ink was likely to be uneven, making the result more or less difficult to read. It was also found that although spacing between lines could be regulated by an attachment on the easel on which the printing was done, it was most difficult to keep the correct spacing between letters and words. Usually, one or

two children in the class proved able to do this laborious work better than others and, since too much of the teacher's time could not be devoted to the preparation of such material, if she were to accomplish all else required of her, this devolved upon the pupils who could do it best. For a short time this may have been good practice, but, after a period, there was no chance of further development, and the precision and length of time required to accomplish the work often caused a nervous physical strain.

There was also a second element to be considered. How were these children to know what to print? The teacher could not give the necessary time and attention to dictating the work, and, if material were prepared by her for the children to copy, there was the strain of reading the original.

The outcome was the development of books in large, clear type, on buff colored paper. The selection of paper took into account the findings of illuminating engineers that black on yellow is more legible than black on white. It also took into consideration the opinion of some ophthalmologists that yellow is the most fatiguing color because it leaves the longest retinal image. A compromise was made by using enough yellow to help in legibility, but not enough to cause eye fatigue.

At first a 36-point type was used (letters ½ inch in size), but, after considerable research, it was found that the eye span is too short to make this size the most advantageous, and special books for sight-saving class children were thereafter printed in 24-point type (letters ⅓ inch in size). There has not been, however, a sufficient amount of research on this subject and there is no certainty that this type is the one which will continue to be used in the future.

For children with such low static vision that they must hold their material close in order to be able to see it at all, a type that includes more in the eye span may eventually prove more satisfactory.

Writing Material.—Again, in the early days, individual seat blackboards were used with chalk, but no one could work long with any group of handicapped children without discovering that their special difficulty may be a symptom of the general physical condition. Much use of chalk at such a comparatively close range caused irritation to the throat, and chalk dust, unsanitary for

children in good general health, proved even more disastrous to those in poor physical condition. For seat work, therefore, large sized, buff colored paper and heavy-leaded pencils were substituted. Considerable work is still done on the large wall blackboards, since children get the benefit of change in position and eye focus and seem to be able to work at a greater distance from the board than when the boards are at the seats. Efforts were made to obtain a chalk in large size that would make a clear, heavy line. The chalk now used is Freart crayon about one inch in diameter.

In addition to general writing material, sight-saving classes in the United States are equipped with special typewriters, manufactured with a type as nearly as possible approximating that in their large type books. It must be emphasized that typewriting is never taught as a means of earning a living, but as a medium of written expression. Naturally the touch system is used, and just as soon as the mechanics of the machine are mastered, the children do their original work on the typewriter. This saves a very great deal of close eye use and, since the type is large enough and clear enough for the children to be able to see without eyestrain, they may use their eyes for short periods to read what they have typed and to make the necessary corrections.

The preparation of original work on the typewriter builds up exceedingly good eye habits and, at the same time, imbues the child with the idea of doing well the first time whatever he is undertaking, thus avoiding copying and recopying of material. It has been demonstrated that even quite young children can be taught to use the typewriter.

Division of Subjects

It has been stated that subjects requiring close use of the eyes are undertaken in the special class, and as many others as seem desirable with normally seeing children. In the first group of subjects are reading, writing and arithmetic. Two subjects not requiring close use of the eyes, handwork and typewriting, are included in this group—handwork because it is most difficult for teachers who do not understand the reactions of various eye difficulties to know what may prove harmful, and typewriting because this opportunity has not as yet been offered to normally

seeing children in regular grades or standards and hence must be treated as a special subject in the sight-saving classroom.

The so-called social subjects—geography, history, natural science, appreciation of music, rote singing, etc.—may be taken with the regular classes, but the preparation for these subjects, such as maps without detail, fulfillment of reading assignments, etc., is done by the sight-saving class teacher. However, the teacher's work in this particular is being considerably lessened by the co-operation of map makers in putting out maps in clear outline with no detail.

Illustrative Material

There seems to be no reason why children in sight-saving classes should be deprived of illustrative material. Large, clear pictures without detail, used with discretion, add greatly to the interest and development of the pupil.

Material for Motivated Handwork

The modern method of handwork for all groups is applied in the sight-saving class. Handwork must have a place in the educational program, and in the sight-saving class it must meet certain requirements: it must be an eye rest; it must be motivated; it must help to satisfy the creative instinct; it must arouse in the pupil so much interest that he will be glad to substitute it at home, as well as in school, for similar activities requiring close use of the eyes.

Educational Opportunities for Partially Seeing Children in Secondary Schools

In the United States secondary schools are divided into two groups—junior high schools and senior high schools. In the experimental days there was no thought of offering partially seeing children education in secondary schools. One reason was that methods of carrying on this work, before secondary education could be considered, had to be developed in the elementary school. The real reason, however, lay deeper. It was current opinion that, because of the seriously defective vision by which pupils in sight-saving classes were handicapped, they should not be educated

beyond the elementary school level. For some time, so tacit was the acceptance of this opinion, that higher education for these children was not even a moot question, except to the individual teacher who saw the need for some action, especially in the case of myopic children. Not only did these children seem to present greater intellectual ability than any other particular group, but the very fact that their eye condition prevented them from joining in the majority of outdoor games tended still further to make them studious, since they were likely to fall back upon the things they could do, however injurious these might or might not be to their sight.

It became evident to the thoughtful teacher that some children would continue their studies whether or not provisions were made for them, and that it would be much better to have them do so under correct conditions than under haphazard ones. Hence, many teachers took upon themselves the added burden and responsibility of keeping such children in their sight-saving classes after they had completed the work of the elementary school, preparing for them an enriched curriculum and, in some instances, giving them the actual work undertaken in junior and senior high schools. As the group needing this assistance grew larger, it became evident that better arrangements would have to be made for both pupils and teachers. The next logical step was to arrange for the education in junior high schools of graduates of elementary schools.

Much consideration was given to what arrangements would prove best. It was thought by some educational authorities that, since these children had from the time of their entrance into a sight-saving class been imbued with the idea of using the best method for taking care of their sight, they should be able to take the responsibility upon themselves in the junior high school. Others argued that children of junior high school age were altogether too young to assume such a burden of responsibility. The outcome was that, wherever possible, junior high school classes were established and placed under a trained teacher, the same methods being used as in the elementary school, except that the responsibility was gradually shifted from the teacher to the pupils.

In the junior high schools, the assignments in reading and for

general preparatory work are so much greater than in the elementary schools that it soon proved impossible for the teacher to read for each pupil those assignments not in large type. The plan of employing student readers was worked out and is being used in a number of places. According to this plan, student readers are selected from pupils in the regular grades who are doing the same work as the sight-saving class pupils. Instead of reading assignments to themselves, they read them aloud, either in study periods or by special arrangements after school hours. All work, however, is done in the school building under proper conditions, so that, when sight-saving class pupils and their readers leave, all preparation has been completed for both groups. Naturally, pupils well up in their subjects are selected as readers.

Eventually, a time came when graduates of sight-saving classes in junior high schools presented the problem of how they were to obtain the more advanced educational opportunities offered in senior high schools. To solve this new problem some cities established sight-saving classes in the senior high schools and conducted them in a manner similar to those in the junior high schools. But the majority of educators felt that it was time for these pupils, many of whom had had nine years of sight-saving class training, to assume the responsibilities that sooner or later would fall to their lot.

Hence, in the majority of cases, two high schools are selected in different parts of the city and graduates from junior high schools are allocated to them, entering these high schools as do all other high school pupils, except that an adviser—a supervisor, a sight-saving class teacher, or a senior—is appointed to help in the selection of courses, to make the necessary contacts with teachers, and to arrange for student readers. Since all freshmen are new to the building, it is necessary to select readers before the close of the previous school year; and usually those readers who have proved efficient in junior high school work are the ones selected.

By the time sight-saving class pupils enter senior high school, they should be so proficient in typewriting that they are able to prepare all their written work directly on this machine. A special portable typewriter has been designed for their use and many of them are permitted to take such typewriters into the lecture rooms

and make their notes directly on them. Another important innovation is that these students are permitted to take all their examinations directly on the typewriter, the questions being prepared beforehand in large type.

Provision for Partially Seeing Children in Vocational Schools

There will be found among sight-saving class pupils, as among those in regular grades, motor-minded children who must be given opportunities for vocational training. In America a few states are attempting to offer such training in a very limited way. Much research is necessary to find what occupations can be safely carried on and, at the same time, offer opportunity for employment.

Opportunities for Partially Seeing Children in Rural Communities

A scattered population makes it well-nigh impossible to gather together a sufficient number of children in any one rural district to warrant the establishment of a sight-saving class. A few states that have established classes in cities have occasionally made arrangements for rural children to be boarded in the nearest city having such classes.

In some instances, where transportation facilities are good, a community class has been established. A greater understanding of the sight-saving class movement has caused teachers in country schools, where there may be a partially seeing child, to reach out for such information and help as will enable them to give the child as much assistance as possible in carrying on the work in the rural school.

Methods of Administering, Supervising and Teaching Sight-Saving Classes

Administrative Direction.—In states where there is a state director of special education, the administrative direction centers in his department. Such administration concerns itself with the arrangements for obtaining and administering the budget and with laying down conditions under which state aid may be granted; certificating of teachers according to the provisions of the educational law of the state; inaugurating of training courses for new

teachers, to meet the state regulations; stimulating the formation of new classes throughout the state, particularly in those places where there are no local supervisors; establishing county classes and making other arrangements for the education of rural children needing this type of specialized education.

There are comparatively few cities that have a sufficient number of sight-saving classes to warrant the appointment of a supervisor who shall devote entire time to do this work. The majority of sight-saving classes are under the direction of a supervisor of all kinds of special classes. Unless such supervisors are specially trained to understand this particular type of education, the results are often unsatisfactory.

Some states have solved the problem of supervision by dividing their territory into two or more sections and appointing supervisors experienced in this work to travel from one city and class to another.

Teaching of Sight-Saving Classes.—There are no courses of study specially prepared for children in sight-saving classes; the object always kept in view is to conform as nearly as possible to the work undertaken in the regular grades. There are two reasons for this. These children are mentally as able to undertake the work as are normally seeing children. About four and one-half per cent of the pupils in sight-saving classes are able to return to regular grades and would be at a great disadvantage if they had been pursuing a different curriculum.

It is the adaptation of the work that is important. With the exception of a very few subjects, the regular school curriculum is followed and the same work is undertaken in the special class as in the regular grade. Where any change is made it is in the nature of a substitution or modification, rather than an omission. Thus, eye fatigue may occur in detailed drawing, but no child is deprived of the chance of illustrating his story by original work because he is not permitted to draw. He may accomplish the same result by free-hand cutting, by modeling, by a sand table project, or by mass painting. Likewise, no child is deprived of map work in history or geography just because he cannot use the maps provided for normal eyes. His map consists of an outline form, black on buff, or buff on black, or in colors sufficiently

contrasted to produce the result of clear outline. There are few, if any, names printed on this map; a plan is used by which special projects are carried out one at a time; a key to names may be given in large type on the opposite page.

In a few cities music scores are permitted if they are in large type but, in the majority of cases, lessons in music are confined to appreciation of music and rote singing. Where a child shows a decided talent for music—instrumental or vocal—special attention is given to him; and efforts are made to provide training under conditions suited to his special needs as a sight-saving class child.

Qualifications for Teachers of Sight-Saving Classes

Since the work of sight-saving classes is carried on as nearly as possible like that of regular grades, it is essential that teachers of these classes have the fundamental qualities and educational training of any good teacher. It is further essential that they undertake special training for the particular work of teaching a sight-saving class.

There are many reasons why a teacher contemplating specialized work, such as teaching a sight-saving class, should have considerable experience with the normal group. Just so far as it is possible, the education of the handicapped runs parallel to that of the normal. A teacher who does not carry into specialized work the normal attitude, or who becomes so engrossed in her own special work that she loses sight of the normal, is likely to add handicaps to those that already exist in her group.

In sight-saving classes, since several grades or standards may be and usually are represented, a teacher should have experience in teaching more than one, so that she will not have to make too many adaptations to new conditions all at one time. On the other hand, a teacher who remains too long in regular work before undertaking new lines of specialized education is likely to find it difficult to make adaptations to conditions differing from those to which she has become accustomed. Successful teaching in regular grades for at least three, preferably, five years should lay a good foundation and help the teacher to keep the normal viewpoint.

Special Courses of Training

By special training is meant training that bears a direct relationship to the work of teaching a sight-saving class. There is a diversity of opinion as to what this special training should include. Since it is often difficult for a teacher to take a full year, in addition to her fundamental training, to prepare for special work, several universities in the United States offer summer courses of six weeks' duration. This may appear a very short period in which to prepare for so important and arduous an undertaking, but a perusal of the work required shows that a real effort is made to give a good foundation.

The student is required to give her entire time for the six weeks' period. The work is divided into four parts: a course on the anatomy, physiology and hygiene of the eye; a course on administration and organization of sight-saving classes; a course on special methods of teaching sight-saving classes; and attendance for observation and practice teaching in a demonstration sight-saving class and at an eye clinic. Since an understanding of eye conditions is essential for carrying on this work successfully, the greatest emphasis is placed upon this section of the work. Only those teachers are eligible who meet the fundamental requirements, hence they are more or less familiar with the physiology of the eye, so that but a brief review is necessary.

Thirty lectures are given, in particular, on refractive errors and common eye diseases likely to be encountered in the sight-saving class. At least twenty hours are spent in an eye hospital or clinic where cases are seen and discussed with the ophthalmologist who conducts the clinic. The clinic usually affords the opportunity to see one or more operations, since the actual knowledge of how, for instance, a cataract may be removed can be gained much better by seeing the operation performed than by reading about it. Thirty lectures with discussions are given in the organization, administration and conduct of sight-saving classes. Thirty lectures with discussions are given in methods of teaching sight-saving classes. Students are required to spend thirty hours in the demonstration classroom to observe methods employed and the various reactions of the children; in addition, some practice teaching is done. Personal conferences with the students are held

by the instructor and further opportunities are offered for general discussion.

But just as education is a continuing process in all groups, so in sight-saving class work teachers are urged to take supplementary courses from time to time, to keep up with modern methods. In many instances, teachers are required to do this in order to obtain advances in salary.

Financing Sight-Saving Classes

The State makes education compulsory. Such a regulation can be enforced only when education is offered in a form that can be assimilated. Hence, it is only reasonable that the State assume its share in making education possible for all children. Fourteen of the United States have assumed this obligation. The provisions for giving financial aid vary according to the educational laws of the state. Such provisions may take the form of: (1) the appropriation of a per capita amount; (2) the appropriation of a general sum for the establishment and maintenance of classes, the distribution to be made by a specified educational department; (3) an appropriation to cover a part or all of the teacher's salary; (4) a combination of two of the above.

Of the various methods presented, the per capita method has proved the most successful, since, unless otherwise specified, the director in charge of administering the funds may use discretion. A class which is being established needs a large outlay for equipment, whereas a class that has already been equipped has to meet only current expenses, including some additional equipment, such as paper, pens, pencils, etc., and the replacement of worn-out material. It is evident that it is possible, under a per capita or even under a general appropriation, to provide for supervision—either whole or part-time, according to the needs—and to pay for student readers for junior or senior high school students.

Justification

It would seem almost unnecessary to have to justify the cost of the education of any child who is educable. Humanitarianism alone would seem a sufficient justification. Yet it must be remembered that the State is responsible to the taxpayers for the

use of public moneys and that, in consequence, the State tends to look upon all education as an investment that will pay justifiable dividends.

The object in educating partially seeing children is the same as in the education of any group—to prevent illiteracy and so to develop the innate powers of the individual that he will not become a liability but an asset of the greatest possible value to the State. This aspect of education is being demonstrated more and more by the method of individual instruction that is being emphasized in advanced school systems, by which a child is developed along the line for which he has the greatest ability. To give a partially seeing child an even chance with the normally seeing to become an asset to the State, it is necessary to provide for him the opportunity to overcome his handicap. In order to do this, such educational facilities must be put at his command as will permit him to develop along the line of his greatest strength, while his weakness, in so far as this is possible, is prevented from getting any worse.

It is obvious that such facilities cost more than those provided for the normally seeing. If, by providing them, the State is enabled to change potential liabilities into actual assets, no further justification is necessary.

Ultimate Aim

Underlying all efforts for the education of partially seeing children there should be a never ceasing work of doing everything possible to make special education unnecessary by:

1. Prenatal and natal care.
2. Greater attention to the eyes of the preschool child.
3. More extended medical service for school children.
4. Improvement in school plants to produce the best environmental conditions.
5. Co-operative effort—medical, educational and social—to eliminate the causative factors of eye difficulties.

Examination of the Eyes of Industrial Employees—Why and How?*

M. Davidson, M.D.

AN industrial plant employing more than 5,000 persons, if eye accidents occur in sufficient number, should have its own ophthalmologist. Annual eye examinations can be entrusted to him as part of his duties

IN considering safety in industry, defective vision as cause of accidents is not to be overlooked. It is only necessary to recall that the history of the safety movement in relation to defective eyes in industry begins with the discovery of color blindness as a major cause of railway and marine disasters. The expansion of motor vehicle driving later made it necessary to provide for the examination of the eyes of drivers. Aviation brought out the importance of depth perception, light sense, and indirect vision among aviators. We have taken these things for granted because the State has quite properly taken care of most of these safety measures by a system of licensing. The State in its physical examinations for some civil service positions also takes care of these safety requirements. In private non-regulated industry the menace of certain ocular defects is, of course, not so great; but the problems are of the same nature as those involved in the State regulations of transport services. While in our individualistic society the State is slow to step in, social, economic and medico-legal considerations have given the question of safety from ocular defects an increasing prominence even in non-regulated industries. Much has already been done along these lines and many pertinent data and practical information about the subject can be

* Presented at the Greater New York Safety Conference, New York City, during the session on "The Eye."

gleaned from two handbooks which I can highly recommend. One is, "The Functions of an Industrial Eye Clinic," published by the Metropolitan Life Insurance Company. The other is, "Medical Supervision and Service in Industry," published by the National Industrial Conference Board.

Related to the safety problem is the problem of contagious eye diseases, such as trachoma, which is quite prevalent in some parts of the country. A growing appreciation of the safety and public health aspects of industry is also indicated by regulations for the physical examination of food handlers.

The industrial efficiency argument for eye examination of employees is, of course, of interest to the employer primarily. While reasonable, in these days of industrial depression, technological unemployment, and technocratic gloom, it is rather an untimely subject. However desirable from the employers' standpoint, the worker and society in general may reasonably object to giving industry, and particularly some discriminating industries, the sole privilege of choosing and picking the cream of labor, and scrapping the remainder as unemployable or relegating them to the less fastidious industries. Some visual defectives are, moreover, the result of industrial accidents or occupational disease.

The third argument for examination, namely, vocational guidance, or the argument of ill health and fatigue, is in the interest of the worker and is preventive in nature. The importance of good vision for health has been amply preached by public health agencies and educational institutions, and the desirability of overhauling the human machine by periodic health examination is common sense and requires no emphasis.

A further argument for eye examination in industry is the medico-legal argument, growing out of the Workmen's Compensation Act, and of the examination of the eyes of injured employees, for compensation. If we bear in mind that 5 per cent of the total insurance companies' bill for compensation, or roughly two million dollars for the State of New York, is paid out for eye injuries, the medico-legal aspect is quite important. A great deal of unnecessary litigation, and an occasional incentive to fraud, could be eliminated if there were a record of the status of the visual apparatus of the employee at the start of his employment. The controversies

with which we are almost daily concerned in compensation examinations may be grouped into problems of old vs. new injuries; traumatic vs. non-traumatic conditions; and congenital vs. acquired conditions. These are not insuperable medical problems, but when lay referees have to decide these questions amidst conflicting expert medical opinions in an individual case, miscarriages of justice are likely to occur. Before going further into the phases of the subject, a review of the nature and prevalence of defective vision is not out of place. Loose statements, almost technocratic, about its extent abound in the literature and the range of defective vision is said to be from 34 to 75 per cent. In the first place, defective vision is a term embracing several conditions: distant vision, near vision, color vision, light sense, indirect vision, and depth perception and disease; conditions not always found combined. There is a widely varying frequency of the different conditions and they are of markedly unequal importance from the four angles as well as in relation to different industrial processes. The following two tables clearly indicate how loose the term "visual defectiveness" is in practice. The standardization of visual requirements recommended by the Committee of the Thirteenth International Congress of Ophthalmology, held in 1929, described in detail in a report of 148 pages, has been summarized in the following table by Dr. Verrey. In this table, *1* stands for perfect, *2* for good and *3* for fair. I have omitted the psycho-technic standards of reaction time, speed, sense of responsibility, as not our subject.

	Railway Engineers	Seamen	Public Motor Vehicle Drivers	Private Motor Vehicle Drivers	Aviators
Form Sense (Visual acuity)	2	1	2	2	1
Orientation Sense (Indirect Vision)	3	2	2	2	1
Light Sense	1	1	1	1	1
Color Sense	1	1	2	3	2
Sense of Depth (Binocular Single Vision)	2	1	1	2	1

The order of required visual perfection, with the psycho-technic standards included, is: aviators, public motor vehicle drivers, railway engineers, sailors, and private motor vehicle drivers.

For industries in general, aside from safety problems, the following table shows the different standards of visual needs, on the principle of 1/1000 for "visual" occupations, that is, the relation of size of object or part of object to the distance at which it is to be seen and corresponding to a visual acuity of 20/70.

Near vision is required by fine mechanics, printers, garment workers and office workers.

Distant vision is required mainly by transport workers.

Both distant and near vision are required by those who deal with moving objects or those who have to move around stationary objects (myopes are particularly handicapped for these occupations).

Depth perception is required by artists, draftsmen, etc.

Color vision is required by embroiderers, signal men, chemists.

Light sense is required by sailors, chauffeurs, miners, night watchmen, etc.

The standards already established by the State from the standpoint of safety and public health may be utilized as a guide by private industry. It should be noted, however, that the standards established by law in this respect are far from high and are not uniform, and that the international committee referred to, which is to report at the next Congress to be held in April of this year at Madrid, has been engaged in standardization of methods of testing the eyes and of the minimum requirements for various public services where the question of safety is involved. That there is need for standardization was proved only three years ago, when the methods of testing marine officers for color blindness employed by the United States Public Health Service proved inadequate to the extent of admitting over 15 per cent of color blind persons, and had to be replaced by more modern and more precise methods. There is also an increasing demand for incorporating tests for color vision for taxi drivers.

Popular figures referring to prevalence of defective vision are misleading. We read in the Industrial Health Series booklet of the Metropolitan Life Insurance Company, otherwise admirable,

that, without taking the severity of defects into account, there are from 10.6 per cent to 95 per cent of people with defective vision, depending on age and occupation. The National Industrial Conference Board, moreover, found rejections by industry for physical defects ranging from 1 to 40 per cent, with hernias and defective vision in the lead. Dr. Shaffer of the Bethlehem Steel Company reported at the 1928 Annual Conference of the National Society for the Prevention of Blindness that 46 per cent of all rejections were because of defective vision.

If we consider that the taxi operator has the most responsible of jobs next to that of the aviator, from the safety point of view, in accordance with the opinion of the International Committee quoted, and that the New York Police Department requires a vision of 20/40 in either eye, and records only about 2 per cent rejection for defective vision among applicants for taxi-cab licenses, we must describe the figures for industry quoted above as out of proportion to the real situation—even allowing for the greater thoroughness of the examinations by industry and for the selectivity of the group that applies for taxi licenses. Collins, whose classical studies are often wrongly quoted, finds that among children from six to sixteen, 10 per cent had rather poor vision (20/40 in one or both eyes) and that 2 per cent were color blind and 1 per cent cross-eyed; and among industrial male white workers, 25.8 per cent had 20/40 and less vision. McAuliff found 22.8 per cent of defective vision from all causes among industrial workers, but only 6 per cent with monocular blindness from all causes, and only 2.26 per cent (113) due to errors of refraction.

If we bear in mind that many of these had better or normal vision in the other eye, the probability is that 4 to 6 per cent is the maximum that comes under the most rigidly applied definition of defective vision among adults. This is borne out by our study of 1,000 compensation cases, which contain as many as 47.1 per cent of injured eyes with sequels, and many more without sequels, and 24 per cent awards for permanent eye injuries. This shows only 20.2 per cent of persons with vision of 20/40 and less in one eye, if we discount simulants and enucleated eyes. The fact, however, that, with exception of 0.2 per cent of bilateral industrial blindness, all are returned eventually to industry, is the most eloquent argu-

ment against popular misconception of the magnitude of the problem. As to the effect of defective vision on accidents to eyes—it must be small, since eye injuries are predominantly from "flying" particles or liquids which good vision alone cannot control.

From the analysis of the problem of defective vision in industry, and the different bases back of the several arguments for eye examination, there grow out logically the procedure and the "how." It can be seen that the major problem is that of safety. This does not differ in its nature from that already provided for in the regulation, by the State, of public services involving the transportation of passengers, but is inherently of lesser and varying importance in private industry. In so far as it is a problem, the standard for public services may be taken as a guide in working out standards for industry, remembering that the term "defective vision," from the standpoint of safety, is not synonymous with low visual acuity correctible by glasses, but is mainly concerned with defects not susceptible of correction by glasses—defective color vision, depth perception, indirect vision and light sense. Such an examination, to make it worth while, should be done by ophthalmologists. It obviously should be a pre-employment examination, free and administered by a public agency. It need not be more frequent than at intervals of three to five years. It may be considered an extension—to adults in industry—of the eye examination which school children receive, administered by the board of education's staff of ophthalmologists. This work might be done by eye examiners attached to public employment agencies, or by the existing Labor Department medical staffs, or by the Motor Vehicle Licensing Bureau staff of medical men.

The medico-legal problems involved in the administration of the Workmen's Compensation Law, as far as the eyes are concerned, could be taken care of at the same time by recording findings and furnishing a copy to the examinee for future use in applying for employment and in controversies in compensation. It is not so ambitious and expensive a plan as it sounds at first. This type of examination requires about eight minutes. An ophthalmologist trained in this work can take care of 50 persons a day, or by examining 10,000 persons yearly of a population of from 30,000 to 50,000 persons. His examination should be limited to the safety

problems and to medico-legal purposes, and his functions should not include prescribing glasses or treatment, industrial selection, or vocational guidance. The data he gathers would also constitute a valuable contribution to science and industry.

Vocational guidance and industrial selection or fitness are problems in periodic health examination and should be the task of the plant medical service after employment. A distinction should be maintained between the purposes of vocational guidance in the interest of the worker and those of industrial fitness for the benefit of the employer. The periodic health examination of employees should help in discovering occupational eye diseases, some of which we know and which are recognized by law as compensable, such as—miners' nystagmus, glassblowers' cataract and the toxic amblyopias from wood alcohol, carbon bisulphide, etc. An occupational disease so far not recognized by law but encountered often enough in the course of examination for compensation to deserve attention is, for want of a better name, what I would call "stone cutters' cornea," consisting of numerous fine dot-like opacities on the cornea, of which the worker himself is not aware. These dot-like opacities look like the marks left on the protective goggles which the workers are supposed to wear, but frequently do not. After years of exposure to stone-cutting and marble-cutting, impaired vision, to a considerable extent, results, but compensation cannot be secured because the impairment is not the result of a single accident. Related to this condition is the anesthesia of the cornea, recently discovered to be quite prevalent in Soviet Russia. It occurs among workers exposed to an atmosphere laden with sharp metal dust. It is probably not uncommon here, and accounts for failure on the part of the worker to notice and report the presence of a foreign body for many days, until it has formed an ulcer. It also accounts for occasional controversies as to the presence of an accident.

Plants employing over 5,000 persons and where eye accidents occur in sufficient number, should have an ophthalmologist, and the annual periodic eye examination could be entrusted to him as part of his duties. Smaller plants could have part-time eye men. Under any circumstance, eye examinations should not be the work of anybody but eye specialists. They cost no more to employ than

optometrists and can do the work of treating and examining, as well as discovering the many general diseases, such as diabetes, nephritis and central nervous system disturbances, which eye examinations disclose.

Summary

1. The arguments for eye examination of industrial employees are derived from four fundamentally different motives: safety; medico-legal problems in workmen's compensation; industrial selection; and vocational guidance. The first two arguments are in the domain of public concern and public health—the last two are in the interest of industry and of the worker respectively.

2. Contrary to prevalent conceptions, the problems involved concern only about 4 to 6 per cent of the working population, and the term, "defective vision," as applied to them, is too broad. It should be specific as to the different elements in vision—visual acuity, color vision, light sense, indirect vision and depth perception, and their varying importance from the different angles of approach.

3. The main problems are safety and compensation for eye injuries. The former is partly solved by the State-controlled examination of all transport employees; by railway, marine, aviation and motor vehicle licensing provisions; and its standards are being now established by an international congress. There should be a pre-employment examination by State agencies for both purposes, at intervals of three to five years.

4. For industrial selection, vocational guidance and elimination of occupational diseases, a different procedure in standardization, on the basis of the special requirements for types of occupation, should be worked out, and should be the task of annual periodic eye examinations by plant medical services.

5. Eye examinations for the purposes mentioned should be the work of ophthalmologists, or "eye physicians," exclusively.

Social Service With Eye Patients*

Eleanor P. Brown

MEDICAL social workers are proving their usefulness in eye hospitals and clinics

IN accepting an invitation to present a paper on social service with eye patients, certain doubts naturally arose in my mind as to the value of anything I might contribute to a group of workers who have so much greater knowledge about medical social service. How could I profess to speak to authorities in this field who in their hospital work are coming in constant touch with persons suffering from eye difficulties of one kind or another and are helping at first hand to solve many complicated problems?

And then I began looking through reports coming into the Society's office from hospital social workers in various places. A case of phlyctenular keratitis under care of the family relief society could respond to treatment only after the need for improved diet was explained to the family visitor and the significance of proper nourishment and hygiene in controlling the disease was understood by visitor and relatives alike. A child with congenital cataract and classified as blind was, through operative procedure and case handling over a long period of time, fitted for education in a sight-saving class. Complete medical care was required in this instance and, as various disabilities were removed, manifestations of nervousness diminished. A general rehabilitation of the patient brought about an entire change in outlook—an eagerness to progress in a normal life with sighted people; one who would have continued to be a drain on the community has become a member of society ready to take his proper place in the world.

* Presented at the Regional Conference of the American Association of Hospital Social Workers, New Orleans, Louisiana, February 12, 1933.

Then there is the girl with interstitial keratitis, for whom a carefully developed plan of co-operation with skin clinic, family, and private physician in the home town, made possible a steady improvement in vision; there is the case of a baby with an acute eye infection, in which convincing the parents of the need for hospitalization and enlistment of the nursing organization for follow-up care prevented total blindness; there is the child with corneal ulcer for whom the all important hygienic and dietary regulations to accompany the medical care could be secured only through skillful and painstaking work with the family and friends; there is the woman with hearing destroyed by infantile paralysis, who failed to realize the importance of operation and continued medical attention when a diagnosis of glaucoma had been made; winning her confidence and the family's co-operation saved sight that in this instance was of double value because of the patient's deafness.

With these and many similar examples before one, hospital social service cannot seem foreign to an interest in the prevention of blindness; nor can we fail to believe that in the hands of hospital social workers lies a power which is great and, as yet, scarcely tapped, to reduce the toll of visual handicaps. A gradual increase is noted in the number of eye hospitals and clinics utilizing social workers, thus providing a vital accompaniment to the doctors' professional skill. May I speak briefly of the Society's part in the promotion of such service, based on our increasing belief in its value?

On April 1, 1928, we entered into active co-operation with the Massachusetts Eye and Ear Infirmary in Boston, by making available in the social service department a special worker for handling glaucoma cases. Dr. George S. Derby, chief of the eye department and a member of the National Society's Board, was particularly interested in glaucoma as a disease capable of control if brought under early medical treatment and continued supervision; intensive work along this line was undertaken at the Infirmary to demonstrate what might be accomplished by a careful and complete method of following up glaucoma patients. It is interesting to turn to the first report of this study and then to the final reporting, made shortly before the Society's withdrawal

from the demonstration on April 30, 1932, when the entire salary of the worker was put on the payroll of the Infirmary to continue the special work as a regular staff contribution. In the summer of 1928, 365 patients were registered in the follow-up files, which contained a fairly complete accounting of all glaucoma patients treated at the Infirmary, since medical opinion in general regards the disease as one rarely cured, though frequently checked in progress. Efforts to trace the 365 resulted in finding that 17 had died, 9 had applied elsewhere for treatment, 2 had left the country, 6 were bedridden and the whereabouts of 34 could not be ascertained; the remaining 297 were kept on the books for supervision and treatment. At the end of 1931, 823 patients were on the follow-up list, an increase indicating not only a much more thorough control of the disease incidence, but also a more general recognition and acceptance by the public of the care offered.

I shall not continue to quote figures, but shall touch on one or two points in the Boston demonstration that, to my mind, stand out with special significance. It has been shown that assignment of a worker to this group made possible the routine follow-up of all glaucoma patients, and that a systematic plan of clinic procedure enabling each patient to have individual and sympathetic consideration could be put through. Facts which might have significance in the study of cause and evaluation of treatment were made available through acquaintance with living conditions and a checking up on the use of medicine prescribed and the following of medical recommendations. The social worker's value as interpreter is particularly great with glaucoma sufferers, who become easily discouraged under the long time treatment; her skill as a case worker may be of greatest assistance to these patients, for whom relief of anxiety and of home complications is vital.

As to whether any special technique in handling eye patients is demanded, distinct from that used with other types of patients, I cannot say. I believe that a real knowledge of case work methods is essential to successful practice, as is ability to capitalize on all one's resources; also an ability to adapt oneself to a position calling, perhaps, for some tactics different from those practiced in other departments. Ophthalmologists have not used medical social

workers to a very great degree; the newcomers must prove their value. I know that without an understanding of the eye and its functions as a part of the body, without an understanding of eye diseases and defects in their relation to cure and disability, the medical social worker would be able to do only half a job.

These thoughts led the Society in April, 1931, to participate in the establishment of an experimental training course to be carried by the Social Service Department at Massachusetts Eye and Ear Infirmary. Scholarships were granted to three workers, and since then two other courses have been given with a total of nine students of varied experience and qualifications being prepared in this specialized way for eye service. Another two are now in training at McMillan Hospital, St. Louis, where the teaching schedule is carried in both the Washington University Hospitals and the George Warren Brown Department of Social Work. Frankly, this training is still in an experimental stage, both from the standpoint of content and student personnel. The Society has not ventured even in this initial work, however, to proceed without the thought and advice of hospital social workers themselves, and members of the American Association experienced in educational methods, in administration and in advancement of the medical social program from many angles, have been called into consultation and have given freely of their knowledge.

Beginning in December, 1931, funds were appropriated for use in demonstrating the sight-saving value of social service with eye patients. Because of a natural limitation in the amount available, we could arrange for only three centers where, for a demonstration period, the Society would share in meeting the salaries of trained workers. In making selection, the location, medical standing and quality of the hospital's social work, if any, were taken into consideration, not to mention a desire on the part of the medical staff and the administration to carry the service during and after the National Society's participation. Wills Hospital, Philadelphia, McMillan Hospital, St. Louis, and Charity Hospital, New Orleans, were chosen. The Society has assumed no administrative responsibility, although it maintains a certain amount of supervision over the work through a monthly reporting from the demonstration workers. In these reports, as well as in occasional reports sent us

by medical social eye workers elsewhere, data that in time may have medical as well as social value are being accumulated.

We in a national office have always to guard against the dangers of making sweeping statements as to how things should be done in a given situation, and of failing to see that situation in its individual setting, with its own unique problems. It is very easy to sit back and state broadly that every eye hospital and clinic should have its social worker as an adjunct to the medical staff, for in general that is what we believe. But it is a generalization, and must be recognized as such. The volume of eye service, size of budget, medical viewpoint, methods of administration, local understanding and affiliations, teaching opportunities, all need to be considered in determining the wisdom of installing a special eye worker. Let us not overlook, though, the very real opportunity through such worker actually to save sight, to stimulate medical understanding, to take part more thoroughly in community development, to progress, however haltingly, towards the ideal of perfect service.

Editorials

A Quarter of a Century of Saving Sight, 1908–1933

TWENTY-FIVE years ago a small group of public-spirited men and women met at the home of Miss Louisa Lee Schuyler, who had just learned that one of the major causes of blindness, ophthalmia neonatorum, could be prevented if a simple precaution were taken with the eyes at the time of birth. Seated in the mellow surroundings, discussing ways and means of reaching the public with this problem, these gentlefolk could not have dreamed that their benevolent scheming would evolve into a world-wide movement to stamp out all blindness.

At that time the immediate problem was the eradication of ophthalmia neonatorum. For that purpose they organized the New York State Committee for the Prevention of Blindness, which later became the National Society. Since then, many new terms have become familiar to prevention of blindness workers—sight-saving classes, preschool vision testing, eye protection in industry, medical social eye work.

On this anniversary we may happily say that ophthalmia neonatorum as a cause of blindness has dropped 73 per cent. Sight-saving classes have increased from two in 1913 to 413 in 1932. Preschool eye testing is being introduced all over the United States. Many states have workmen's compensation laws which are designed to enforce safety in industry. The membership of a few individuals who comprised the State Committee in 1908 has grown to 30,000, representing the whole country. From this New York State Committee has developed not only the National Society, but also the International Association for Prevention of Blindness, which has its office in Paris.

In the satisfaction of our achievements, however, we must not overlook what remains to be accomplished. More than 4,500 sight-saving classes are still needed in the United States. Only one in 25 preschool children has the benefit of vision testing. Scores of children suffer eye injuries annually as the result of

unsupervised play with dangerous firearms and fireworks. Trachoma still remains, for the most part, a baffling problem. Eye accidents in industry are one of the most serious causes of blindness. Much remains to be done to reduce the incidence of impaired vision and blindness which occur chiefly in middle life and later. Medical social eye work is still in its infancy.

As long as there is any blindness from any preventable cause whatsoever, the National Society continues to feel the same challenge which its founders met so courageously twenty-five years ago.

Sight-Saving Training Courses for Teachers

The need of special education for partially seeing children was announced by Franz von Gaheis as early as 1802, but more than a century passed before his suggestion bore fruit in the United States, with the establishment of two sight-saving classes in 1913. Yet, only twenty years later, there are 413 such classes. The experimental stage is over—special education for the visually handicapped has proved itself.

Today we are faced with the need for national economy. Individual states, as well as the nation, are balancing their budgets and cutting appropriations in education, along with their other economies. The number of sight-saving classes may not continue at present to increase in the same proportion, but the spirit of expansion of facilities for special education, as brought out so clearly in the White House Conference, will not languish. Ten times the present number of sight-saving classes are required to take care of all the children needing this special type of education. When resumption of growth comes—as it inevitably must—the most pressing need will be for trained teachers and supervisors. To those who look forward to that time, the summer sessions for training in sight-saving class work offer an opportunity for real service in education, as well as for professional advancement.

Note and Comment

Dr. Lapp Heads Rehabilitation Association.—During the conference of the National Rehabilitation Association in Chicago, in October, a step toward the nation-wide development of resources for the reorienting of the handicapped was taken in the selection of Dr. John A. Lapp as the director of the Association. His broad experience in social work and health projects and his wide connections with educational, social and health organizations all over the country, as well as his inspiring outlook on the problem of rehabilitating the maimed and the handicapped, give promise of real accomplishment in this field.

Prevention of Blindness Procedure Checked in Rhode Island.—The Rhode Island Public Health Commission has recently adopted a standard form of birth certificate, and one of the questions to be filled out is: "Was a prophylactic for ophthalmia neonatorum used? . . . If so, what? . . ." It is felt that the inclusion of this question will go far towards educating doctors and midwives in the importance of using a prophylactic promptly in order to prevent any cases of babies' sore eyes.

Sight Conservation Celebrated in Japan.—Under the auspices of the Central Society for the Welfare of the Blind, Japan observed its second annual "eyesight conservation day." Lectures, motion pictures and slides on sight conservation, and clinics for school children and adults marked the celebration of a determination to reduce preventable blindness through popular education.

Conservation Essential in Industrial Recovery.—Now, more than ever, it is necessary to watch the little costs that add to the general expense of plant operation. Standing high in the list of small things that increase overhead are accidents. Although the direct cost of accidents to industry is, conservatively, but one per cent of the payroll, the attendant costs of accidents raise the percentage from 1.5 to 25 per cent, according to figures of Mr. H. W. Heinrich, in the December issue of *Safety Engineering*. All meas-

ures that tend to decrease accidents—more consistent and persistent use of safety devices, better illumination, and the fullest co-operation between employer and workers—will benefit both groups, by eliminating preventable accidents and lowering costs of production.

Summer Courses for Teachers and Supervisors of Sight-Saving Classes.—Arrangements have been completed to offer courses of training at Western Reserve University, the University of Chicago and Columbia University during the coming summer sessions. The course at Western Reserve University, Cleveland, Ohio, will be given from June 19 through July 28. Application for registration must be mailed to the registrar before June 1. Registration is on June 19. The Chicago course will open June 26 and continue through August 3. This course will be limited to 16 students. The Columbia course will open July 10 and continue through August 18. A course will probably be offered at State Teachers College, Buffalo, N. Y., but arrangements have not yet been made. Details regarding these courses will be given in the next issue of the REVIEW.

Eyestrain Reflection of Health in Tropics.—To those whose eyes are exposed to the constant and harsh glare of desert or sea, particularly in the tropics, a note by Dr. A. F. MacCallan in the *Lancet* is of interest. He reports that focal infection in the teeth or tonsils, or any reduced state of health, increases visual discomfort in the glaring countries. He advises that all minor health obstacles be corrected, that the eyes be adequately refracted, and that dimming glasses may be used for eye comfort.

Mary Dranga Campbell Joins Brooklyn Charities' Staff.—Recognized as one of America's outstanding workers for the blind, Mrs. Mary Dranga Campbell, recently executive director of the Missouri Commission for the Blind, has been appointed director of work for the handicapped (blind and crippled) under the Brooklyn Bureau of Charities.

Prevention of Blindness, a Farsighted Economy.—"We build palatial hospitals at the foot of the precipice all ready for the

casualties, and never take the trouble to put up a warning notice or a railing around the top," said Dr. G. W. N. Joseph, at the quarterly meeting of the Northern Counties Association for the Blind in Sunderland, England. The amount of money being spent for the care and training of the blind is increasing yearly, and in prevention of blindness lies the only hope of curtailing this tremendous and often unnecessary expense. Dr. Joseph pleaded for thorough certification of the blind as a means to insure that all blind persons, and only blind persons, receive benefits, and to assist, through ascertainment of causes, in preventing blindness in the future. Many causes of blindness, which become apparent through investigation of those already blind, may be eliminated, and the major causes of blindness ascertained. The resolution providing for certification of blindness through ophthalmic examination was put to the meeting and adopted unanimously.

Increased Lighting Investment Repaid Tenfold.—At a time when educational expenditures are being viewed with an eye to cutting, it is interesting to note that the Alabama Power Company recently conducted an experiment demonstrating the wisdom of spending a penny to save a pound. Improved lighting in a schoolroom cost $44 more than the usual amount, but class failures in this room fell more than 60 per cent, saving the educational board (and the taxpayers) $420, the estimated cost of repeaters in this grade.

Course on Eye Conditions.—For the benefit of school nurses, sight-saving class teachers, public health nurses and social workers, New York University, in co-operation with the State Department of Social Welfare, is offering a course on "A Survey of Eye Conditions," February 7 to May 23, every Tuesday evening from seven until nine, at the Medical College Building, 338 East 26 Street, New York City. Miss Dorothy Behner directs the course with the co-operation of prominent ophthalmologists.

Sight—the Motoring Sense.—Certainly no blind person would attempt to drive a car, yet many of the drivers of motor cars have visual handicaps nearly as great. Lack of full field of vision, tendency to night-blindness, hypersensitivity to glare, diplopia,

early visual fatigue, all of these difficulties are as dangerous to drivers as might be complete blindness. Dr. Alvhh R. Lauer, who writes about the eyes behind the windshield, in the *National Safety News* for November, 1932, urges that state traffic bureaus set up for drivers minimum standards of vision compatible with safety.

The American Standards Association has undertaken a study of motor cars with the view to reducing accidents. They, too, stress the need of the motorist to see and be seen, but from the standpoint of car visibility. Cars should be constructed so as to permit the driver easy visibility ahead and to the side, without necessitating his moving his head about for better vision. Clear windshields are needed, as are headlights that pick out objects distinctly without causing glare in the eyes of oncoming motorists.

May Day—Mothers and Babies First.—The slogan adopted for 1933's Child Health Day, "Mothers and Babies First," reminds those concerned with the prevention of blindness of first steps to be taken to prevent blindness in future generations: prenatal care and the routine employment of prophylaxis to guard against babies' sore eyes. That the figures for the past year for admissions to schools for the blind because of ophthalmia neonatorum have risen slightly, instead of falling as they have heretofore, is sinister warning of the need to continue the campaign for this simple safeguard.

Follow-Up Service in Eye Cases.—If all the money in so-called "eye-glass funds" could be converted into salaries for experienced eye social workers, the ratio of prevention of blindness to the sum of money now being expended would be increased to greater proportions, was the opinion of Ruth B. McCoy, R.N., director of prevention of blindness of the New York State Commission for the Blind, expressed at a recent meeting of the New York City Welfare Council Committee on Development of Social Service in Eye Clinics. The social worker's grasp of all factors involved in the problem of a person needing eye care may help him to adjust his individual problems, often arising out of his visual defect, and show him, or his parents, in the case of children, how the expense

of glasses may be met, how to care for the glasses, and how to conserve his vision.

Sight-Saving Classes a World-Wide Project.—At the annual meeting of the International Association for Prevention of Blindness, held in Paris, November 19, the organization and teaching of classes for the "weak-sighted" were the principal topics of discussion. Papers on methods of instruction and selection of pupils were presented by Prof. Pierre Villey (France), Dr. N. Bishop Harman (England), Mrs. Winifred Hathaway (United States of America), Prof. Dr. Martin Bartels (Germany), Dr. Auguste Dufours (Switzerland), and Dr. M. E. Redslob (France), stressing the local and international problems involved in this type of special education.

Goggles—$2,000 per Pair.—Pennsylvania's Department of Highways puts a valuation of $2,000 a pair on four pairs of goggles recently exhibited in that department. Each pair of goggles had saved the eyes of its wearer, saving the state about $2,000 in compensation costs; the value of these same goggles to their wearers cannot be measured in money.

Miners' Nystagmus Again Studied in England.—The third report of the Miners' Nystagmus Committee finds again that the primary cause of nystagmus is the low illumination under which miners in general work; in several mines where the defective lighting system has been replaced with a more efficient system, the incidence of the disease has fallen off sufficiently to prove this theory. The best lighting comes from the use of electric cap lamps, or from electric hand lamps, with as much as 4.5 candle power. The Committee recommends that practical treatment of the disease consist of elimination of a hopeless dependence on compensation by the provision of opportunities for work of some kind, the end being complete restoration to full work underground, under conditions of proper illumination, even if this has to be preceded by a period of work in daylight.

Institute of Ophthalmology Opened.—With the purpose of promoting the scientific study of diseases affecting the eye, the new institute of ophthalmology, the gift of Mr. Edward S. Hark-

ness, at the Presbyterian Hospital was opened on January 16. Emphasis in this center will be laid upon the best modern clinic and hospital care of patients affected with diseases pertaining to the eye.

Cost of Compensation.—Of the total cases eligible for compensation in New York State, according to the special bulletin on *Cost of Compensation, Two Years, 1930 and 1931*, issued by the Department of Labor, three-quarters are for temporary compensation. Next in volume is the compensation paid for permanent partial disability, i.e., the loss of an eye, finger, hand, etc. The total cost of permanent partial disability is nearly twice as great as the entire cost of temporary disabilities. Injuries to the eyes with total loss of useful vision of both eyes were found to be the most frequent cause of permanent total disability, next to the skull and back injuries, rendering the workman incapable of resuming work. Tables of injuries for which compensation of any sort was awarded, and statistics showing the costs of such compensation, are a poignant reminder of the importance of practical accident prevention.

New Apparatus for Testing Field of Vision.—The need for accurate tests of the field of vision, particularly for persons applying for blind relief, has created a hand campimeter, described and illustrated in the *British Journal of Ophthalmology* for December, 1932. The apparatus consists of three concentric circular rings of wire; the innermost, when held twenty inches from the patient's face, delimits a field of 10 degrees. The simple device shows not only the field of vision, but the sections of the field which are limited.

Ohio Fights Babies' Sore Eyes.—Nursing service for a period of two weeks is provided by the State of Ohio for cases of ophthalmia occurring in infants two weeks old or younger, when such need is reported by the local commissioner of health. Of the 947 cases of ophthalmia occurring in the first two weeks of life, reported to the department of health, in a year's period, only 23 proved to be of gonorrheal origin. Nursing service provided for these cases at state expense averaged $211 per patient, a very small part of the state's burden had these infants become blind.

State Institute on Conservation of Vision.—Under the direction of the New York State Commission for the Blind, prevention of blindness department, a two-day institute on prevention of blindness will be held in Buffalo, April 28 and 29. Of special interest will be the discussion on: The Anatomy and Physiology of the Eye; The Art of Illumination; Nutrition in Relation to the Eyes; Diseases of the Lids; The Eye in Diagnosis of General Diseases; Errors of Refraction; Muscle Imbalances; Adequate Follow-Up in Eye Cases; and Education of the Visually Handicapped. The prevention of blindness department of the New York State Commission for the Blind, at 80 Centre Street, New York City, will send detailed programs upon request.

Eye Defects Increasingly Noted in England.—There are indications of a gradual increase in eye defects in school children, according to a note in a recent issue of the *Medical Officer* (England). Doubt is expressed as to whether this increase is because more attention is now paid to vision inspection, or whether the adjuncts of modern living—the movies and artificial illumination—have taken a higher toll of sight. There is no doubt, however, that in cases of myopia the general maintenance of nutrition and hygiene is of great importance.

New Artificial Irradiation Protects Eyes.—The harmful effects of ultraviolet rays on the eyes have heretofore been counteracted by the wearing of cumbersome protective goggles during exposure to artificial sunlight. In Paris, a new method of administering artificial sunlight has been demonstrated; the lamps are directed toward the ceiling, from which the rays are reflected by small metal reflectors. Shades attached to the reflectors prevent direct irradiation, and, in looking up towards the ceiling, no dazzling effects are encountered. With this "artificial beach," children may be exposed for a longer period and may play without fear of danger to the skin or eyes.

Missouri Holds Rural Diagnostic Eye Clinics.—The Circuit Court Room of the Court House in Perryville, a town of nearly three thousand inhabitants and the county seat of Perry County, was the scene of an eye diagnostic clinic on March 14, when 265

persons from five counties registered for examination. The medical director of the Missouri Commission for the Blind, Dr. Harvey J. Howard, and two other members of the examining staff, Dr. W. E. Yount and Dr. H. L. Cunningham, drove a total of 360 miles in their own cars to the clinic and return. They worked from shortly after 8:00 a.m. to 6:30 p.m., giving their services without remuneration of any kind, and examined 140 persons, which included all of those who were still present at that late hour. No one was turned away without service who cared to stay.

Eye diagnostic clinics are held by the Department for Prevention of Blindness of the Missouri Commission for the Blind in various parts of Missouri, at the request of local interested organizations, sponsored by medical societies, wherever such exist, or by the doctors of the community.

Eye examinations are made by members of the examining staff of ophthalmologists of the Commission, assisted by members of the staff of the Department for Prevention of Blindness. The diagnoses form the basis for constructive work in the prevention of blindness. Underlying causes are discovered and recommendations made; no treatment is given at the clinics. The recommendations may be only corrective treatment for the eyes, or may involve a general physical examination for the removal of a remote constitutional cause, as focal infection or disease of a vital organ, such as the kidneys.

Community resources and interests are pooled to provide the necessary facilities. Rural communities rarely have ideal quarters. Whatever building or room is available is adapted to the needs and used satisfactorily; sometimes it is a school room, a court room, a church. Volunteer services of local interested individuals or organizations, added to the Department's personnel, care for the large number of persons who register. Medical and social records are secured, taken back to the office, analyzed and follow-up instigated for treatment, operation, hospitalization, sight-saving school work, or whatever is indicated by the recommendations of the examining doctors.

Often doctors, nurses, medical students and others attend the clinics for the professional advantages which accrue from observation and explanations given by the staff examiners.

Three medical social service workers specializing in eye work, Mrs. Dora Zane of Honolulu, T. H., Miss Clare Gillen of Cleveland, and Miss Dorothy Hosford of Philadelphia, took advantage of the opportunity afforded by the Perryville clinic to observe methods of providing service for a scattered population from a large, strictly rural area and later to study the methods of follow-up from the office of the Department for Prevention of Blindness in St. Louis.

Mrs. Zane was on a scholarship from the National Society for the Prevention of Blindness and was spending two weeks in Missouri for observation and experience, at the request of that organization. She had just completed four months at the Massachusetts Eye and Ear Infirmary and four weeks in New York and was returning to develop work for the promotion of eye health and prevention of blindness in the Hawaiian Islands. Miss Gillen and Miss Hosford are both on scholarships from the National Society for the Prevention of Blindness and are at present studying eye work at Washington University, St. Louis.

Sight-Saving in Canada.—"One Year on Exchange," the experiences of a Canadian sight-saving class teacher in a similar capacity in Glasgow, Scotland, is interestingly told in the January issue of *Serving Sight*, a publication issued by the Canadian National Institute for the Blind. Another article of interest, generally, to educators and those concerned with the problems of the partially sighted, is "A Few Observations by the Employment Department of the Canadian National Institute for the Blind," by J. F. Clunk, on vocations and training for partially sighted children. The author urges the principle that a normal outlook be cultivated in the visually handicapped. The workaday world cannot accept physical handicap as excuse for shirking or fleeing from reality. Extra education for the partially sighted child must be a genuine help in vocational placement and in his ultimate adjustment to life.

The Eye Is the Final Judge of Lighting.—All theories of lighting engineers must be put to the test of the human eye before they can be accepted. Among the problems that confront the illumination expert, said A. B. Read, in a paper read before the Institution of Electrical Engineers in England, are those of glare, contrast, shade

and color. The old method of casting all light downward is bad because the contrast between the amount of light on the working plane and the upper illumination is uncomfortable. A lighting too uniform also has the disadvantage of being tiring. A complete absence of shadows would not do for some types of work, such as sewing, where discrimination of threads in material of the same color would be almost impossible without shadows. In the discussion which followed, it was pointed out that the engineer usually considers only the normal eye, and that to include proper lighting for those with visual defects the help of an ophthalmologist is needed.

Physical Fitness in Aviators.—A plane is no better than the pilot who manages it, the pilot no more efficient than the eyes through which he sees to direct his machine and his cargo. Dr. E. H. Padden, flight surgeon for the United Air Lines, calls attention to the need in aviators of good vision, space perception, and eye muscle balance, in an article in *Medical Times and Long Island Medical Journal.*

Industrial Eye Accidents High in France.—From statistics gathered from leading ophthalmologists in France by the International Association for Prevention of Blindness, and reported by Prof. de Lapersonne in the August issue of *Protection*, the French safety journal, it is shown that eye accidents, minor and major, are of high frequency. In one automobile factory, with a total of 3,600 accidents a year, 10 to 12 eye accidents of minor severity occur a day, while only 11 serious accidents of any sort happen in a year. It is recognized that careful attention to these minor eye accidents can prevent greater complications. The possibility of making the use of goggles mandatory is dependent upon the perfection of goggles for facile seeing.

Glare Shield Protects Motorists.—Need of protection from glare, not only from oncoming headlights in night driving, but against the reflected glare of sunlight or snow, has been met by the use of a simple green shield which, operating on a spring device, may be set into place against the windshield, or, with a pressure of a finger, will turn up, out of the way, against the top of the car.

Reading with Closed Eyes.—A new use for the small X-ray machine has been described by Dr. A. H. Pirie in the November issue of the *Canadian Medical Association Journal.* For his demonstration he uses a perforated film which may be read with the eyes closed when X-rays are brought close to the lids. The practical value of this new use of X-ray is shown in many ways: a metallic foreign body in the eye may be made to cast its shadow on the retina and, through the use of a brass grid, the metal may be exactly located. In cases of complete opacity of the cornea, or of cataract, the field of vision may be mapped. Bits of glass, being fluorescent, may also be seen in the eye by the examining ophthalmologist.

Eye Defects and School Achievement.—What is the effect of certain physical factors upon the mental capacity of school children? This was the question that English health officers sought to answer in making a study of the school children in Falkirk and Stirling. Slight defects of vision were found decreasingly in the advanced groups, while the retarded groups showed an increasing number of children with slight visual defects. The more serious defects followed this same rule, showing up more strongly and at an earlier age in the retarded groups. Obvious conclusions are drawn, that visual defects blunt mental acuity.

Preventing Eye Accidents.—Prevention of eye accidents in plants and factories is an important item in the reduction of compensation costs and overhead, and safety directors have bent every effort to abolish this expensive calamity. Posters of warning, cracked goggles on display, rules and regulations regarding the wearing of goggles, have been used in the prevention campaign. In the plants where every person—workmen, foremen, executives and passing visitors—is required to wear goggles throughout departments where any eye hazard exists or might exist, the eye accident risk is reduced to nothing.

Do Eyes Contribute to Motor Casualties?—More thorough vision testing for applicants for automobile drivers' licenses, as a means of preventing accidents, was advocated by Maxwell Halsey, traffic engineer of the National Bureau of Casualty and Surety

Underwriters, in an address before the session on "The Eye" at the Fourth Annual Greater New York Safety Conference, held on March 1. "Present examinations," said Mr. Halsey, "covering color blindness, visual acuity and field of vision, do not necessarily tell whether the operator will or will not have accidents. There is a considerable demand for improvements in eyesight examinations which will not only tell what picture the eye sees, but what effect this has in the brain of the operator. It is suggested that eyesight tests cover such items as the ability of the operator to recognize a hazard; the timing of the operator (his ability to judge speed and distance); the ability of the operator to see 'the whole picture' and not merely one part of it; and the reaction time of the operator to pictures which show a hazard."

At this same session, which was sponsored by the National Society for the Prevention of Blindness, Dr. M. Davidson, ophthalmologist of the New York State Department of Labor, talked on "Eye Examination of Industrial Employees—Why and How?" and Mr. Louis Resnick, director of industrial relations of the Society, discussed "Elimination of Eye Hazards Through Engineering Revision."

Health Education Conference.—The American Child Health Association will hold its seventh Health Educational Conference in Ann Arbor, Michigan, from June 20 to 24, inclusive, at the invitation of the University of Michigan, Summer Session. As previously, the conduct of this Conference will be characterized by the co-operative work of all members, and the discussions will center on practical problems in the school health program in teacher, secondary and elementary education. Further information may be obtained from the Director of Educational Service, American Child Health Association, 450 Seventh Avenue, New York City.

Editors' Announcement.—The Sight-Saving Review will welcome letters or excerpts of general interest for its Forum section, assuming no responsibility for the opinions expressed therein. This section is offered as a medium for discussion and exchange of opinions, as well as for questions. Specialized questions will be turned over to consultants for authoritative reply. Every com-

munication must contain the writer's name and address, but these will be omitted on request.

National Society Notes.—The National Society reports with deep regret the death of two of its valued advisers and friends: Mr. Holbrook Fitz John Porter, member of its Board of Directors and of the Executive Committee; and Mrs. Corinne Roosevelt Robinson, who served from 1926 to 1931 as a member of the Board of Directors, and from 1931 until her death, as honorary vice-president.

The education of parents and teachers in the importance of eye hygiene is a large part of the program for conservation of vision. Mr. Lewis H. Carris, managing director, has talked on prevention of blindness and shown the film, "Conserving Sight and Preventing Blindness," to the parents of pupils at P. S. 89, New York City, and to the teachers of the New Jersey School for the Deaf; he also addressed the Vice Principals' Association, New York City. In the interests of conserving sight in industry, Mr. Carris acted as chairman of the section on "The Eye," of the Fourth Annual Greater New York Safety Conference, on March 1.

The annual conferences of the International Council for the Education of Exceptional Children and of the National Education Association, held in Minneapolis, February 20 to 24, were attended for the National Society by Mrs. Winifred Hathaway, associate director. Mrs. Hathaway participated in the program of the International Council for the Education of Exceptional Children with a paper on "Sight-Saving Classes." On this western trip she also had the opportunity to talk about sight-saving classes at Hamline University, St. Paul, Minnesota, and to speak to a meeting of sight-saving class teachers in Chicago.

Medical social work in eye clinics assumes an increasingly important rôle in the prevention of blindness. Miss Eleanor P. Brown, secretary, represented the Society at the Regional Conference of the American Association of Hospital Social Workers at New Orleans, Louisiana, on February 11 to 13, and presented a paper on "Social Service with Eye Patients." Miss Brown also visited the newly organized training course for medical social workers in eye clinics, being given jointly by the Washington University Clinics and Allied Hospitals, in St. Louis, Missouri.

Miss Mary Emma Smith, R.N., director of nursing activities of the National Society, gave a demonstration of preschool vision testing at the Bethlehem Day Nursery in New York City. She also talked to the New York Industrial Nurses Club on conservation of vision in industry.

The committee on statistics of the blind, a joint project of the National Society for the Prevention of Blindness and the American Foundation for the Blind, announces the appointment of Miss C. Edith Kerby, statistician of the National Society, to its membership.

Dr. Park Lewis, vice-president of the Society, has recently been appointed to the editorial staff of the *American Journal of Ophthalmology.* The University of Buffalo has also recently honored Dr. Lewis, in presenting to him the Chancellor's Medal for outstanding public service.

We are pleased to announce that Mr. John M. Schiff has accepted membership on the Board of Directors and Dr. Walter B. Lancaster has consented to serve on the Advisory Committee. The name of Mr. Schiff has long been known in the field of philanthropy; Dr. Lancaster is consulting ophthalmic surgeon to the Massachusetts Eye and Ear Infirmary in Boston.

Current Articles of Interest

Recent Advances in Ophthalmology, Oscar B. Nugent, M.D., *Clinical Medicine and Surgery,* January, 1933, published monthly by Clinical Medicine and Surgery, Chicago, Ill. The author shows the progress made in ophthalmology through the use of ultraviolet irradiation for diseases of the eye and for trachoma; he lists as advances transplantation of the cornea; the work done in retinal detachment, particularly through the work of Gonin; intracapsular operation for removal of cataract, as well as forceps extraction; the use of contact lenses; the use of the slit-lamp and the corneal microscope for the demonstration and localization of foreign bodies in the eye; the treatment of sympathetic ophthalmia through serums.

Glaucoma, Edward H. Cary, M.D., *New England Journal of Medicine,* December 8, 1932, published weekly by the Massachusetts Medical Society, Boston, Mass. The study of glaucoma has led ophthalmologists to realize that the eye is not in the body, but of the body; in other words, the disease, glaucoma, is generally secondary to a disease of the general system. Ophthalmologists should examine all patients over the age of thirty-five for symptoms of glaucoma, for only through early detection is the disease arrested and sight conserved. Treatment of the specific disease and suggestions for thorough study of the whole body are outlined.

Bacterium Granulosis Conjunctivitis Compared with That Produced from Human Trachoma, Ida A. Bengtson, *Public Health Reports,* December 9, 1932, published weekly by the United States Public Health Service, Washington, D. C. Culture inoculation of monkeys with *Bacterium granulosis* showed no difference from the infection caused by direct transfer of human trachoma, except in the fact that the former infection was of somewhat greater activity. The results show that the appearance of lesions in monkeys cannot be used in the study of human trachoma.

The Human Seeing Machine, M. Luckiesh and Frank K. Moss, *Progress,* January, 1933, published monthly by Street and Smith

Publications, Inc., New York, N. Y. The authors ask whether the fact that, at the age of 60, 95 per cent of the people have defective vision is due to natural degeneration of the visual apparatus, or whether the strain of working for years under inadequate illumination may be an important contributing cause to visual impairment. From their study of the human seeing machine, the eye, they have concluded that much visual impairment may be prevented when proper illumination for eye tasks is supplied. Experiment has shown, too, that nerve strain lessens with greater intensity of light and increases with diminution of light.

Etiology of Myopia, Frank H. Rodin, M.D., *Archives of Ophthalmology*, February, 1933, published monthly by the American Medical Association, Chicago, Ill. Reviewing the modern theories of the cause of myopia, the author finds no one dependable cause, but a combination of causes, which may be mechanical, hereditary or acquired. He finds that high myopia is a disease, while true, or low, myopia is a condition which after correction need give no further concern.

The Light That Doesn't Fail, P. R. Holmes, *National Safety News*, January, 1933, published monthly by the National Safety Council, Inc., Chicago, Ill. Modern artificial light is more dependable than daylight and it can also furnish the health-giving rays of real sunlight. More attention to lighting equipment in the plant will enable employees to perform their work with less strain and more safety.

School—Or a Job? Hugh Grant Rowell, M.D., *Hygeia*, February, 1933, published monthly by the American Medical Association, Chicago, Ill. A short story bears the moral that good eyes, as well as good general health, are necessary safeguards against possible accidents at work or play. A boy who feared to be called "four eyes" was converted to this realization.

Practical Points in Refraction of the Eye, Dunbar Roy, M.D., *Southern Medical Journal*, September, 1932, published monthly by the Southern Medical Association, Birmingham, Ala. From a study of the records of 18,000 patients, the writer has formulated some theories on the best methods of refraction. He suggests that

while refraction may appear to be an exact and mathematical science, it is rather an art which must be suited to the individual. He recommends the use of trial glasses in the ophthalmologist's office, and a more careful check-up of filled prescriptions.

Medical and Surgical Treatment of Squint, John H. Burleson, M.D., and J. Burleson Moore, M.D., *Texas State Journal of Medicine*, December, 1932, published monthly by the State Medical Association of Texas, Fort Worth, Texas. The writers urge that the watchful waiting method of treating squint be discarded, since treatment should be begun at the earliest moment. The causes and treatments of squint are various; each case demands individual study.

Temporary Changes in the Refraction of the Eye in Diabetics, R. Affleck Greeves, F.R.C.S., *British Medical Journal*, November 26, 1932, published weekly by the British Medical Association, London, England. A transient refractive change in the eyes of a patient may be a warning of diabetes. Two cases are reported in which the eye-grounds were normal, and only further physical study revealed the diabetic state. The refractive peculiarities disappeared after treatment with insulin was undertaken. Although others have studied this phenomenon, the underlying biochemical cause is still obscure.

On the Management of Ocular Injuries, William C. Finnoff, M.D., *Colorado Medicine*, January, 1933, published monthly by the Colorado State Medical Society, Denver, Colo. Since in no part of the body is the early management of injuries so essential as in the region of the eye, the author outlines procedure in treating eye injuries and injuries close to the eye.

The Care of the Eyes of Industrial Workers, Marcelli Shaw, M.R.C.S., *Journal of State Medicine*, December, 1932, published monthly by the Royal Institute of Public Health, London, England. Not only has the social conscience of the public and of employers awakened to the need of protecting the general health of workers, but the economic value of health conservation has also been demonstrated. Bearing in mind the fact that the eye is not in the body, but of the body, it is realized that many general sys-

temic diseases—nephritis, diabetes, venereal disease, and diseases of the cardiovascular system—may cause serious impairment of the vision. The most common eye disorder is eyestrain, caused by excessive use of the eyes, ofter under poor lighting conditions. Medical aid may advise lenses for correction of refractive errors, or counsel improved eye hygiene. Consideration of proper lighting is of paramount importance, and prompt recourse to medical aid in case of eye injury is advised.

Problems in Ophthalmology, Leo L. Mayer, M.D., *Illinois Medical Journal*, November, 1932, published monthly by the Medical Profession of Illinois, Oak Park, Ill. Brief résumé of current trends in ophthalmology, touching upon methods used in detachment of the retina, glaucoma, cataract, trachoma; and diseases of the lids, cornea, extra-ocular muscles, uvea and retina. A lengthy bibliography makes this article of special interest to those who wish to inform themselves of current practice in any special field of ophthalmology.

A Safe Method of Cataract Operation, J. S. Shipman, M.D., *Journal of the Medical Society of New Jersey*, November, 1932, published monthly by the Medical Society of New Jersey, Orange, N. J. The report of 100 cases of extra-capsular cataract extraction is given, with a full description of the technique. Results showed that needling for secondary cataract was necessary in little more than a quarter of the cases.

Diseases of Common Interest to the Dentist and the Ophthalmologist, William F. C. Steinbugler, M.D., *New York State Journal of Medicine*, November 1, 1932, published twice a month by the Medical Society of the State of New York, New York, N. Y. The relation between dental abnormalities and eye conditions has been long recognized; the author reviews the accepted theories on this relationship. The frequent types of dental abnormality causing eye infection are pyorrhea, caries and infection. The most dangerous form of dental infection is that involving the pulp, in which the diseased material is forced into the bloodstream and into remote regions of the body. The iris, ciliary body and choroid are the parts of the eye most frequently involved. Outlining accepted

forms of treatment for eye conditions following dental infection, the author concludes that, next to syphilis and tuberculosis, dental infection is the most common form of focal infection; while every effort should be made to preserve the teeth, it should be borne in mind that in doubtful cases the eye should be given first consideration, and the elimination of oral sepsis should take precedence over preservation of the teeth.

A School Health Program for the Physician, Allen G. Ireland, M.D., *Journal of the Medical Society of New Jersey*, November, 1932, published monthly by the Medical Society of New Jersey, Orange, N. J. A comprehensive and rounded school health program, aiming toward the ideal, rather than any program now in practice. The author stresses the co-ordination of education and health teaching, each bringing something to the development of a full, happy life.

Eye Diseases in Childhood, Charles Leonard Gimblett, M.D., *Mother and Child*, October and November, 1932, published monthly by the National Council for Maternity and Child Welfare, London, England. A lecture delivered during the special course in public health and general nursing at the College of Nursing stressed the common eye diseases and difficulties encountered among children. Included are ophthalmia neonatorum; lacrimal obstruction; acute conjunctivitis among school children, commonly known as "pink eye"; chronic conjunctivitis; visual impairments due to congenital syphilis; glaucoma, or buphthalmos; and cataract. Something of the etiology, course and treatment of these conditions is outlined.

Book Reviews

INJURIES OF THE EYE. Harry Vanderbilt Würdemann, M.D., Sc.D., F.A.C.S. Second Edition. St. Louis: The C. V. Mosby Company, 1932. 900 p. Ill.

This is the second edition of Würdemann's *Injuries of the Eye.* The first was published in 1911 and presented the author's experiences over a period of twenty-two years. This, the second edition, is the achievement of forty-two years of endeavor in the field of ocular injuries.

No attempt has been made to cover the literature completely. The work in the main represents, first of all, Würdemann's own personal experience. However, in cases where this has not been sufficient, he has not hesitated to use the findings of others. Although essentially practical in treatment, adequate pathological data have been included to elucidate the processes occurring in damaged tissues. The volume is handsomely illustrated—the color plates are excellent. Particularly interesting are the pictures dealing with the hazards of industry. There are numerous fine drawings made by the author himself.

The book is divided into three sections: first, "General Injuries"; second, "Injuries of Special Structures of the Eye"; third, "Forensic Medicine." Under the first heading, injuries due to mechanical, thermal, chemical and electrical forces are considered. Common types of injuries occurring in domestic life and in the industries are classified and described. It seems that the most serious eye accidents happen to men working in iron and steel. Especial attention is paid to sympathetic ophthalmia—that still little understood and disastrous condition in which, later, the uninjured eye also becomes involved. In the diagnoses of eye injuries Würdemann clearly demonstrates the use and value of the various aids, such as the ophthalmoscope, focal illumination, sideroscope and the magnet. The subject of biomicroscopy is dismissed with the statement that, in the author's opinion, while the slit-lamp is valuable as an academic instrument it is of no particular benefit in examining injury cases. However, an excellent and com-

prehensive discussion of radiography follows. The advice quoted from Dixon that "every injured eye should be X-rayed" is very significant. The chapter on the prophylaxis of injuries of the eye is well illustrated and contains the Goggle Code of the American Steel and Wire Company, giving the occupations in which the use of goggles is compulsory or desirable. It is the author's experience "that there is less difficulty in enlisting the support of the employer than the assent of the men to adopt precautionary measures."

In Part Two, "Injuries of the Special Structures," all kinds of injuries to the coats and contents of the eye, the lids, the orbit and to the visual nervous system are considered in great detail. The frequent use of pertinent case reports from the author's own extensive practice is highly commendable. This chapter is complete and up to date and by itself would be a worthy contribution.

The volume is concluded with a treatise on forensic medicine, which will be of value not alone to ophthalmologists but also to those interested in the industrial and social aspects of eye injuries. Here are considered medico-legal practice, protective legislation, pensions and accident insurance. In addition, a digest of workmen's compensation laws throughout the world is included. Under the caption of "Visual Economics," Würdemann gives his method for a scientific estimate of economic damage.

There is certainly no other book in the English language that so completely handles the subject of eye injuries; consequently, it is indispensable for reference purposes in this branch of ophthalmology.

Milton L. Berliner, M.D.

The Experimental Study of Reading. M. D. Vernon. Cambridge: Cambridge University Press, 1931. 191 p.

Miss Vernon proposes "to give a concise account of any experimental work . . . which throws some light upon the psychology of reading." Few critical readers, however, will admit that all important material has been considered, or that parts of the author's discussion are relevant. The book is concerned mainly with a consideration of eye movements, perception, and legibility

in reading, with the major emphasis on eye movements, which constitute Miss Vernon's own field of study.

A survey of methods of observing and recording eye movements led to the justified conclusion that photographing a beam of light reflected from the cornea while the subject reads is most adequate although not ideal. The various types of eye movements are described with special emphasis on the relatively rapid saccadic moves employed in reading.

It is difficult to understand why sensations of eye movements are discussed, since this contributes nothing to an understanding of the reading process. Furthermore, the sections on visual perceptual processes in adults and in children, while adequately done, are somewhat superfluous and are not particularly relevant to the subsequent discussions of visual perception in reading.

The real contribution of this book is found in the section on eye movements in reading. Particular mention should be made of the important analyses of subjective accompaniments to variations in ocular behavior. The effect on eye movements of interest, relevant and irrelevant associations and imagery, and feeling-tone is cited from the author's own ably conducted investigations. She arrives at the important conclusion that a moderate kind of irregularity in sequence of reading movements need not be inconsistent with the best kind of critical appreciation. In fact, such irregularity may indicate the presence of "illustrative thought and rational reflection."

Because of inadequate methods of experimentation and conflicting results, little reliable information on legibility of print is available. Various typographical factors which may influence the legibility of single letters, words, and connected discourse are critically examined. The author's inference that "the criterion of legibility should be based upon the reading of children" because their reading is apt to be more analytical than that of adults, and because their reading habits are unstable, is valid only if (1) variation of typography affects reading performance of children, and (2) optimum typographical arrangement for children is also optimum for adults. Neither possibility has been established as fact, and indeed there is some evidence which indicates that the opposite may be true to a certain degree.

The book reveals an omission of citation and discussion of several studies whose consideration would have, in some instances, modified the author's conclusions. This is particularly true of the section on reading disabilities, and to a lesser degree, of the chapter on legibility. In view of the excellent sections on eye movements, however, the book is to be considered a valuable contribution in the field of reading.

MILES A. TINKER, Ph.D.

ARTIFICIAL LIGHT AND ITS APPLICATION IN THE HOME. The Committee on Residence Lighting, Illuminating Engineering Society, Mariquita Dygert, chairman. New York: McGraw-Hill Book Co., Inc., 1932. 145 p. Ill.

Until the last few decades, visibility and safety were the primary, if not the only, considerations in the use of artificial light. Of late years the incandescent electric lamp, independent of wind and draft and with its almost unlimited flexibility and low cost, has given importance to two other factors. These are comfort and beauty; and at the same time their antagonist, glare. To those who are sensitive to these things this book will offer innumerable interesting suggestions.

In looking over its contents, one wonders why the authors did not present the three strictly technological chapters, if not in a separate part, at least together and in sequence. "Characteristics of Incandescent Lamps" is the title of the third chapter; and "Fundamentals of Electricity" and "Wiring for the Home" of the fifth and sixth respectively. It would seem better that these should have been grouped, since the remainder of the book, from the point of view of the householder, deals with the more human aspect of the subject, from the lamp socket out, so to speak.

As to this latter unsegregated portion of the book, the first chapter is appropriately entitled "Light and People." One is here led through a brief sketch of the history of lighting. Light and shadows are discussed as "Fundamentals of Lighting." A chapter on "Light and Color" follows. Chapter seven discusses "Lighting Equipment"—fixtures, table and floor lamps, and glare, the enemy of comfort. The eighth and last chapter has suggestions to offer as to the lighting of the several rooms of the house.

It is realized that in those rooms in which the family principally lives the lighting equipment, whether lit or not, and the distribution of light must be considered in connection with the other furnishings and decorations of the room. The two are not separable—they are parts of a single decorative scheme. To this end, naturally, it is impossible to lay down hard and fast principles or definite rules of practice. Taste—a good taste—must govern, and suggestions are of value. These are copious, both in the text and in the numerous illustrations.

The three technological chapters should present no difficulty to the layman who is interested, but neither here nor elsewhere is the material, in general, explicit or full enough to warrant the hope, intimated in the foreword, that the volume will find favor as a textbook. Rather, it is a source of ideas, in the matter of lighting, for the home-builder and home-maker.

Not from the lines of the text, but from a consideration of the personnel, does it appear that the authorship is commercial-minded. This fact, together with limitation of space, will assure the reader that he will find nothing in the book that is not good for him to know.

The text is followed by a very short dictionary of illumination terms and a list of questions on each chapter for the benefit of the student.

PERCY W. COBB, M.D.

THE EFFECT OF COLOR ON VISUAL APPREHENSION AND PERCEPTION. Miles A. Tinker. Worcester: Clark University Press, Genetic Psychology Monographs, XI, February, 1932, pp. 61–136.

During the last ten years the tendency has increased rapidly to use color and color combinations in conveying messages through visual symbols. Familiar examples include posters, billboards, automobile licenses, and newspaper and magazine advertisements. As pointed out by Tinker, "two important justifications for the use of color in advertisements and the like are attention value and the pleasant feeling-tone which they arouse. In employing colors for these purposes there is danger that the word or word symbols may lack adequate visibility." In view of the limited amount of scientific experimentation in this field, Dr. Tinker recently carried

on a series of studies to secure accurate knowledge of the effect of color on visual apprehension and perception.

The effect of color was measured in this study by an analysis of apprehension scores for a homogeneous series (all symbols on any stimulus card being of the same color) and for a heterogeneous series (each succeeding letter being of a different color). The study aimed also to determine "the influence of affective value, attention value, and luminosity of colors on apprehension and perception of symbols" and the influence of letter position on visual apprehension.

Thirty-two stimulus cards were used in the homogeneous series and twenty-four in the heterogeneous series. The colors used were black, orange, violet, blue, red, neutral gray, green, yellow. Fifty men and 50 women students participated in the experiment with homogeneous colors, and 100 men and 100 women in the heterogeneous series. Each stimulus card was exposed for three seconds. The effect of color was determined by the method of paired comparisons.

Great care was observed at each step in the study to insure accurate results. For example, the tests were scored in three different ways and the advantages and limitations of each method determined. The reliability of the results was determined "by correlating the scores of the odd versus the sums of the even scores and then applying the Brown-Spearman's 'proflicacy' formula." The findings were also checked with the results of related experiments. One may accept with considerable confidence, therefore, the following conclusions: "The all-important determinant of visual apprehension and perception of printed words, letters, and similar symbols is the luminosity contrast between character and background"

It will not be possible in the space available to review the various significant findings. They have a direct bearing, however, upon printing situations in which colors are employed for attention value, affective value, and the like. Wherever quickness of perception is essential, "care should be taken to use a color or brightness combination which produces a maximum brightness contrast between symbol and background." The report should be of special interest not only to those responsible for the preparation of ad-

vertising materials, but also to those who are concerned in any way with reading and pictorial materials for children and adults with defective vision.

WILLIAM S. GRAY, PH.D.

Briefer Comment

THE STORY OF MEDICINE. Victor Robinson, M.D. New York: Albert and Charles Boni, 1931. 527 p.

The author traces the history of medicine from the stone age down to the modernization of medicine and medicine as it is practised in America. The book is well written and the material interestingly presented. Since the story is one of general medicine, it is perhaps not surprising that so little space has been given to the advances of ophthalmology, which is of especial interest to us. There are a few allusions to optical developments, and the chapter on the modernization of medicine includes a description of the work of Credé in finding the prophylactic, silver nitrate, for the prevention of blindness in newborn babies.

It is perhaps well for those of us who are concentrating on the care of the eyes to read a book like this, which shows so logically that the eye is, after all, only a part of the body, and which makes us conscious of the importance of keeping the body, as a whole, well.

SAFETY AND HEALTH OF THE SCHOOL CHILD: A SELF-SURVEY OF SCHOOL CONDITIONS. James Frederick Rogers, M.D. Washington: United States Office of Education, 1932. 29 p.

A brief and comprehensive questionnaire on school health projects, through which school heads may find a reliable self-appraisal of the school health program. Physical conditions of the school—ventilation, illumination, sanitary conditions—and facilities for health practice and precept are questioned; remarks and suggested bibliography are added to show proper practices in health education.

Organization and Administration of a State Program of Vocational Rehabilitation. Bulletin No. 161, Federal Board for Vocational Education. Washington: United States Government Printing Office, 1932. 59 p.

A discussion of the principles and methods involved in the organization and administration of a state program of vocational rehabilitation, prepared under the direction of the Federal Board for Vocational Education. This bulletin has endeavored to find the best current methods of initiating and sustaining state and local programs of rehabilitation to serve as a guide in similar projects throughout the nation.

Annual Report of the Institution for the Chinese Blind, 1931. 22 p.

Marking the twentieth year of the existence of this school for the Chinese blind, this anniversary booklet shows the growth of the school, the activities of the pupils, the aims of the school to train its pupils toward a full life, and the need for more of this work in China.

Annual Report of the Canadian National Institute for the Blind. 1931–1932. 93 p.

Of particular interest to readers of the Sight-Saving Review is the part of the annual report of the Canadian National Institute for the Blind dealing with the activities of the prevention of blindness department. Trachoma has continued to receive its full appropriation from public health and governmental sources, since any economy in this direction would result in far greater expenditure later. Sixteen sight-saving classes are now in operation in Canada and, during the past year, it has been arranged to have large type books printed in Canada for these classes. The establishment of a sight-saving magazine, *Serving Sight*, has added materially to the resources and inspiration of the teachers of sight-saving classes and others interested in the prevention of blindness. The mimeographed stories of sight saving for school children have been widely distributed and have aided in spreading the message of sight conservation.

Contributors to This Issue

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Diet and Eye Health *

Walter F. King, M.D.

THE author points out that "many eye troubles are due to upsets in the physico-chemical equilibrium." We need more minerals, especially calcium, in our diet; the main sources of calcium are milk and green vegetables

SINCE the earliest of times people knew that there was a relation between the food eaten and the development of the body. In ancient Egypt the literature records instances of people living on restricted diets who saw poorly at twilight. Naturally, our knowledge of foods and their values was increasing through the ages, but the real impetus for extensive study arose during the World War.

Slogans played a large part in bringing to the people the importance of foods in war. "Food will win the war" led the slogan list. We all recall the meatless Sundays, sugarless Mondays, breadless Tuesdays and so on, without enough days to cover the work. All this brought our attention to the various values of food.

For some time it has been known that foods contain something just as important as carbohydrates, fats and proteins. It was not until 1912 that the word "vitamin" was coined as a name for these unknown substances in food. And now, in 1933, we still do not know what a vitamin is, although we have been able to separate them into seven groups and show, in part, the necessity of each one to the normal performance of bodily functions.

What is a food? Anything which, when taken into the body, serves to nourish or build up the tissues or to supply heat.

* Presented at the Institute on Conservation of Vision, given under the auspices of the New York State Commission for the Blind, Prevention of Blindness, April 28–29, 1933.

What are the constituents of foodstuffs?

1. Proteins
2. Carbohydrates
3. Fats
4. Minerals
5. Vitamins
6. Water

Proteins

The proteins are absolutely necessary to life. As the tissue is used in metabolism the proteins replace it. Our first source of protein is meat, or animal protein, which is also the best in quality. Proteins are found especially in meats, fish, eggs and milk. Vegetable proteins, though not as good in quality, have a certain chemical composition which is needed for proper nourishment. Vegetable proteins are found especially in cereals, beans, peas and nuts. The highest nutritive values are found in liver and kidney protein, both of which play a small rôle in the average diet.

Recent investigation showed that proteins of poor quality, along with a deficiency in vitamin A, will produce xerophthalmia quicker than proteins of high quality. An experiment carried out in 1930 showed that proteins have a decided effect on increasing tissue healing. This is important not only in eye surgery, but in the healing of eye diseases and wounds the recuperative period is shortened, and the chance for a serious outcome is lessened.

Normally, the body forms proteins which act against disease; directly, by destroying the germs, or indirectly, by neutralizing poisons produced by germs. This is part of the defensive mechanism we hope to increase when we give protein injections or injections to avoid diphtheria.

Carbohydrates

The carbohydrates or sugars make up a large part of our diet and are chiefly concerned with the production of energy.

Sugars are found in most of the things we eat, either as a part of the food or added for flavoring. The storehouses for sugars are especially the liver and muscles. There is now good evidence that sugar is stored in the skin. This is important in skin diseases

and superficial eye conditions. Cases of blepharitis, lid eczemas and corneal trouble often respond well to rigid curtailing of carbohydrates; and the disease readily returns when the offending foods are used again.

Let us not overlook diabetes, a disease that is brought about when the body is unable to utilize the sugars. Many of the diabetic patients with high blood sugar develop diabetic cataract. These cataracts are rapid in onset and are operable. Results of operation are less favorable than in simple cataract, due to the poor healing of the wound and the susceptibility to iritis. Again, we see the seriousness of eye disease complicated by diabetes, in the condition called retinitis, with its destructive effects on vision.

Before leaving the subject of sugars, let us take due warning of our increasing consumption and why we must be watchful. The average yearly consumption is over 100 pounds per capita over and above the requirements of the body. Sugar does not contain a single vitamin or essential mineral salt. We can say that the continued consumption of large amounts of non-protective substances, such as sugar, without a corresponding increase of protective substances, might in time react on the body and on a delicate organism such as the eye, with its sensitive vascular system. The increase in the consumption of protective substances, such as proteins and vitamins, has not increased as has sugar consumption.

The daily need of carbohydrates—including sugars and starches, which are converted into sugar in the body—is 350 grams, or between one-half and two-thirds of a pound.

Fats

The third common foodstuffs are the fats, which represent the most concentrated form of energy foods. Fats are stored in the body and act as sources of energy. Fats are not only taken into the body as such, but are synthesized in the body from carbohydrates. Remember this when you feel inclined to eat a half pound or so of candy.

There are two kinds of fat stored in the body: one type, so-called "glandular," because it has the appearance of gland tissue; and the other, just the ordinary adipose tissue. Investigation has shown that vitamin A is stored in the glandular type of fat.

It is as a conveyor of vitamin A that fat plays an important part in relation to the eye. The animal source of fats is very important in diet in contrast to vegetable fats, which contain little or no vitamin A and none of the other vitamins. Vitamin A we shall consider a bit later.

Minerals

The next large group of foodstuffs are the minerals. The function of each of them is not yet known and much remains to be found out about their action. The important minerals in metabolism are calcium, copper, iodine, iron, phosphorus, potassium and sodium. At the present time we know something about calcium and very little about sodium, and of the others nothing at all in relation to the eye. Calcium is found in larger amounts in the body than any other mineral, and is lacking more frequently than any of the other elements in our diet.

Calcium.—A certain type of eye disease called vernal conjunctivitis usually shows calcium deficiency in the blood. Exactly how this deficiency works is not clear, but evidence is appearing to show that calcium protects against excessive intake of carbohydrates and proteins which can cause hyperplasia of the conjunctival tissue. The main sources of calcium are milk and its products, green vegetables, oranges, nuts and cereals.

Animal experimentation has shown that blindness can develop in low calcium diets. The diets were well balanced in all other respects. Examination showed the blindness was due to degeneration of the optic nerve. Cod liver oil added to the rations will prevent the condition.

Sodium.—Sodium is found chiefly as sodium chloride, or salt. A good mixed diet contains sufficient sodium without the addition of salt, which means an extra burden on the kidneys. Early inflammation of the retina can often be arrested by salt-free diets, as shown by the work of Volhard and Allen.

Vitamins

The composition and action of vitamins are still an unknown quantity, but they appear to be analogous to hormones. An extensive medical literature has grown up on this subject, but let

us try to confine ourselves to the vitamins as they relate to the eye.

Vitamin A.—Vitamin A is of special interest to the eye physician. It is also called anti-ophthalmic and anti-infective—terms which in themselves tell us what the vitamin does.

In the production of ophthalmia due to vitamin A deficiency, we have two related factors at work. First is the effect on the glands that normally keep the eye in a moist condition. The secreting glands of the eye—lacrimal, Zeiss, Moll and Meibomian glands—undergo atrophy, and hence are unable to furnish moisture for the eye. At the same time we get changes in the epithelium or covering cells of the eye. They change to the squamous or keratinized type of cell found in our skin. From here on we can easily visualize the gradual loss of vision due to scarring and infection.

Foreign investigators have given us much knowledge concerning lack of vitamin A, the most detailed description being given by Dr. Pillat from Vienna, who spent three years in China, where deficiency diseases are endemic.

The first symptom the patient complains of is night blindness. The patient is still able to see, but the retina has lost much of its sensitivity and hence only responds to the stronger stimuli encountered in daylight. There is no doubt that vitamin A plays a leading rôle in the metabolism of the retina. Investigators have shown the retina to be very rich in vitamin A, containing even more than butter fats. They have also shown that the retina will become fatigued much more quickly in vitamin A deficiency.

Next follow the drying or xerotic process and pigmentation of the conjunctiva. The final stage is keratomalacia, or softening of the cornea. Naturally, when the epithelium suffers such destruction, the first line of defense is undermined and all types of infecting organisms may attack the eye.

The anti-infective property of vitamin A is not definitely established, but experiments have shown that animals on a high diet of vitamin A were better able to overcome an infection of the eye. This was also aided when vitamin B was added to the diet.

A very striking experiment was carried out in 1930 which showed the healing properties of vitamin A in connection with ultra-violet therapy in eye diseases.

Results in approximately 40 cases with vitamin A and 40 cases without vitamin A, are as follows:

> With vitamin A—improvement noticed after 6 doses of ultra-violet light.
>
> Without vitamin A—improvement noticed after 11.8 doses of ultra-violet light.
>
> After use of vitamin A—cured after 16 doses of ultra-violet light.
>
> Without use of vitamin A—cured after 27 doses of ultra-violet light.

Vitamin A is found liberally in milk and its products, cod liver oil, eggs, liver, kidney and some vegetables—carrots, lettuce, spinach, tomatoes and bananas.

Recently a substance called "carotene" was isolated from carrots and other vegetables which has the same action as vitamin A. It is thought this is a precursor to vitamin A.

The body stores vitamin A. As stated, it is abundant in the retina, liver and fatty tissue. The fate of vitamin A in disease is shown in the work of Wolff, who determined the amount of vitamin A in the livers of patients who died from acute and chronic diseases. Acute diseases showed 20.7 units per gram of liver; chronic diseases—6 units per gram of liver.

Newborn infants show very little vitamin A. This emphasizes the importance of furnishing a generous supply of vitamin A for the nursing mother and the necessity to keep up the supply in chronic diseases.

Vitamin B.—Vitamin B was first associated with a disease called beriberi or polyneuritis. Now we know that vitamin B has two independent fractions: B_1 concerned in neuritis and B_2, sometimes called vitamin G, deficiency of which is associated with pellagra.

B_1 deficiency shows toxic substances affecting the nervous system. Patients are nervous and irritable, and complain that their eyes tire easily. Diseases of the uveal part of the eye show improvement on a diet rich in vitamin B.

B_2 or G, which is related to pellagra, also produces a variety of ocular symptoms—tearing, conjunctivitis, corneal and vitreous opacities.

Thus, vitamin A is related to vitamin B in many actions, and both acting together seem to play a major rôle in eye disease.

The body stores very little of vitamin B, hence the need of vitamin B in our daily diet. It is found especially in milk, eggs, vegetables, cereals, liver and kidney.

Vitamin C.—Concerning vitamin C and the eye, we have little or no evidence of a direct relation. Cases of vitreous and retinal hemorrhage of unknown etiology are thought to be associated with lack of vitamin C.

Indirectly, vitamin C affects the eyes in the deficiency disease, scurvy, which affects the general nutrition in a marked degree.

The body does not store vitamin C, hence the constant need of it in our diet. It is found especially in fruits and vegetables; milk contains a little; meats and cereals practically none.

Vitamin D.—Like vitamin C, vitamin D is little concerned with eye nutrition directly. Primarily vitamin D has to do with calcium metabolism and also with the parathyroid glands.

Now in the lens of the eye, we may find a cataract associated with tetany, and in tetany the calcium level in the blood is low. The person, usually a child, need not have marked symptoms of tetany but often shows only mild convulsions. The normal growth of the lens is disturbed at the time so that opaque lens fibers are laid down. When the condition has subsided, the lens again lays down transparent fibers. As the lens in our eye grows continuously, we can tell from the position of the opacity the approximate age at which the patient suffered this nutritional upset.

So far, vitamin D is the only vitamin manufactured from a chemical compound. Vitamin D is ergosterol, and, when irradiated with ultra-violet light, its value is increased. This vitamin is stored to a slight extent in the body.

Few natural foods contain Vitamin D, among them being cod liver oil, liver, and eggs; milk and vegetables supply only small amounts.

Vitamin E.—Vitamin E plays its rôle in fertility and possibly in the assimilation of iron.

Let us not forget that well-known condition called allergy. It is well known that certain foods cause urticaria, eczema, asthma, etc. Likewise certain foods may cause conjunctivitis. Several

cases are reported as caused by strawberries, tomatoes, eggs, etc. The cases did well on removal of the cause; all reacted to skin tests, and symptoms returned when the offending foods were again used.

Summary

The metabolism of the eye is very delicate and complex. It seems more and more, as research goes on, that many eye troubles are due to upsets in the physico-chemical equilibrium.

Proteins are plentiful in our diet but the quality must not be forgotten.

Carbohydrates play too large a part in our diet. We are using two to three times the amount required. Let us get away from routine cereals, bread, potatoes and rich pastry.

Let us remember the body needs minerals; especially calcium, which is the mineral most deficient in our diet.

All the vitamins are important. Vitamin C is usually lacking in our diets.

Remember that vitamins A, B and D are especially concerned with eye nutrition.

How can we know we are doing right? First, let us forget about the number of calories needed and all this excess standardization. Choose a diet of milk and its products, eggs, green vegetables, fruits, small amounts of meat and restrict the amount of carbohydrates, especially our American "meal cap"—pastries—except, of course, on special occasions.

As the final word, let me emphasize that the interest lies not only in well-defined eye disease, but especially in the fact that chronic deficiencies produce numerous vague and borderline cases which we fail to recognize early. It is the interruption of disease in these early stages which makes for real medical progress.

Vision and Other Tests for Automobile Drivers*

Maxwell Halsey

MORE thorough vision testing is urged for applicants for automobile drivers' licenses. Only 16 states have any drivers' license law at the present time

THE cheapest car you can buy today will go 75 miles per hour. It is being operated upon roadways which encourage a high speed. But conditions and circumstances frequently require a slow speed if accidents are to be avoided. This requires a great deal of ability and judgment on the part of the driver if he is to drive in accordance with conditions and to resist the temptation of smooth roadway surfaces and fast cars. Accident records show that drivers have not been able to realize the disparity between potential or encouraged speeds and the conditions requiring slower speeds.

It takes years of training before a man is permitted to run a locomotive—which runs on a private right-of-way at speeds lower than the potential of the automobile—yet we permit men with no formal training, and in most states, no examination, to drive a vehicle capable of doing terrific damage.

Street and highway speeds are still increasing and will continue to do so. This places a high premium on the ability of the driver and brings into play some factors not important at the lower speeds. This is indicated by the fact that although the number of autocides decreased last year, the deaths and non-fatal injuries per accident actually increased.

The increased speed of the heavier units, such as trucks and

*Presented at the Greater New York Safety Conference, New York City, during the session on the "Eye."

buses, is another element which places a premium on the operator. It is harder to control them and they are capable of far greater damage if they get out of control.

Are Drivers' Examinations What Are Needed?

In attempting to improve present conditions it is necessary to analyze each project and see if it is exactly what is needed at the time and if it will operate in such a way as to develop and utilize all factors in the situation. It is believed that drivers' examinations of the right sort are exactly what the present situation requires. It is felt that their effective application can produce an improvement of at least 30 per cent.

Develop Contact with Motorist.—Safety education has been effective with children, because, to a certain extent, we have considerable control over them. The fact that they are in the act of receiving formal education provides this control. Industrial and fleet accidents have diminished materially. In their cases the control was brought about by the employer-employee relationship. The element which has made it difficult to improve the private driver situation has been the total absence of control. A driver's examination makes an important contact with the motorist and helps to establish some degree of control. Without this change in the situation real improvement is not possible.

Importance of the Driver.—It must be admitted that of all the elements in the traffic accident situation the driver is the most important. This will be particularly true until the differences between comfortable and safe speeds have been reduced. It is essential that motorists be pulled into the prevention program. Their actual participation in an examination will do much to accomplish this.

Accident-Prone Drivers.—It has been definitely established that there is a marked difference in drivers. Recent statistics from Connecticut show that in that state 15 per cent of the drivers are responsible for 100 per cent of the accidents.* It should be obvious that we should not wait for a long string of accidents and then take punitive action. The examination provides the meas-

**The Trouble Makers*, Robin B. Stoeckel, Department of Motor Vehicles, Bulletin No. 90, State of Connecticut, 1932.

uring stick by which we can judge motorists without having to wait for so much damage to be done.

What Is the Purpose of Drivers' Examinations?

There have been many conflicting statements regarding the purpose of drivers' examinations. Some have held that the chief purpose is to keep the poor drivers off the road. This has naturally had a bad public reaction, since it is of negative character. The duty of the state is to assist the citizens and to protect them. Strictly punitive measures should not be emphasized and should be used as a last resort. The following are believed to be the chief aims of examinations: Education; correction of defects; education of accident-prone drivers; removal of unsafe drivers from roadways; and establishment of standards of attainment.

Education.—The chief purpose of drivers' license examinations should be to educate the motorist—to encourage him to learn enough so that he will not cause injury to himself and to others. There is no other method which can do this so excellently. You can spread the safety story through newspapers, over the radio, in magazines, and by public addresses, and a good part of it will roll right off the backs of the poor drivers. But if they cannot get drivers' licenses and they cannot drive until they have acquired the correct knowledge and ability, you may be sure that they will learn it. This method of teaching the motorist is positive and efficient. It corresponds closely to the formal safety education of children and to the teaching required by the employer, both of which have been so effective. This purpose can be made to have a strong public appeal—it is designed to save the life of the man who really learns how to drive safely and passes the examination. It can prevent more accidents than any other use of the examination because it reaches everyone.

Correct Defects.—The second purpose of an examination is to correct defects in operation. Here again the element of service to the public comes in. Those who pass a good examination show that they know how to drive safely. Those who fail find out what they do not know and have a chance to learn without having to have an accident demonstrate this fact for them. In the absence of real schools for driving this is the only available method of finding out

how safe a driver you are—without having to pay for an accident if you are not.

Educate Accident-Prone Drivers.—The third purpose of the examination is to pick out the accident-prone operators, show the cause of the particular difficulty, and indicate what can be done about it. The driver who has passed a good examination and still has more accidents than the average should be required to retake the examination—a more comprehensive one. His failure to avoid accidents indicates that he has either forgotten what he originally knew, that he has since acquired some defect, or that he is not using what he knows. The second examination should indicate what has happened. If he has forgotten, he has another chance to learn. If he has acquired a defect, this will be discovered and it may be possible to correct it. If he has not forgotten, but is not using what he knows, this will be discovered. If he is unwilling to apply his knowledge, strictly punitive action should be applied. It is known that many of the accident-prone drivers can be improved and turned into good drivers. The examination should indicate the cause and in many instances this cause can be removed.

Remove Small Percentage from the Roadways.—The fourth purpose of the examination is to remove from the roadway the small percentage who lack the physical or mental equipment necessary to become safe drivers. This is not the most important cause because comparatively few will fail to respond to other treatment. We require children to go to school in order to make good citizens of them. Why should we not educate and examine motorists in order to make safe citizens of them, instead of merely letting them go on and doing nothing but punish them?

Standards of Attainment Foster Competition.—The fifth purpose of examinations is to establish standards of attainment. This will foster competition among both drivers and examiners. It will set up driving as a privilege and not a right. It will make the license "ticket" mean something to its owner. He will strive to get it and to keep it, and he will want to be and think he is just a little better than the average. He will pride himself on his safety. Today we rarely hear anyone bragging about being a "safe driver." I am afraid they are ashamed of it. Most of the bragging is done about "fast drivers."

What Has Been the Effect of Drivers' Examinations and License Laws?

We believe that much can be accomplished by drivers' examinations and license laws. Let us see what has actually happened where they have really been used. A study by the National Safety Council showed that "nine states which have passed drivers' license laws with examinations since 1916 have had 29 per cent fewer motor vehicle fatalities than they would have had if they had experienced the same percentage increase as the other states." A more recent study, based on gasoline consumption, shows that the states having standard drivers' license laws have decreased their fatalities 25 per cent, whereas states without a license law showed increases from 7 to 22 per cent. The states using a substandard law without examination, for example, showed practically no change from 1926 to 1931. It would appear that the examination has played a most important part in accident reduction.

While the above is definite proof of what has been accomplished, it is believed that the extended use of these methods is capable of bringing about a still greater improvement.

What Would We Like to Know About an Automobile Driver?

Let us now consider what we should like to know about a motorist if we are to measure his driving abilities and find out whether anything can be done to improve them.

Knowledge of What Makes a Safe Driver.—The first thing we want to know is whether or not he knows what makes a safe driver. This has little to do with whether or not he knows the details of the law, or the age limit, or the weight limit, or the fines. It has to do with what caused each important rule and regulation to be promulgated, and the reasons for the various signs and signals. It also has to do with how much he knows about the little "tricks of the trade" which enable safe drivers to keep from having accidents and which are not covered by law.

Physical and Mental Equipment and Ability.—The second thing we want to know is whether the driver has the physical and mental equipment and ability to put into practice what he knows. And if he lacks any one ability, whether he can learn it or compensate for

its lack and so become a safe driver. The percentage of those who are so physically and mentally unfit to drive that they cannot be satisfactorily improved is exceedingly small.

Mechanics of Car Manipulation.—The third thing we want to know is whether the driver can manipulate his car sufficiently well for modern high speed conditions. The actual operation of cars is becoming more simple every year. Only a small percentage of those who want to drive are incapable of learning to manipulate a car satisfactorily.

Attitude of Driver Toward Public.—The fourth thing we should like to know is the attitude of the driver toward the rights of other drivers, toward the law, and toward the public as a whole. This is obviously very important. No matter how skilled in car manipulation or in a knowledge of how to avoid accidents he may be, if he chooses to ignore them he will have accidents. At first thought it might appear impossible to determine this by examination. However, motorists drive to a considerable extent by habit. It may be possible in the near future to develop tests which will measure habitual attitudes toward others. Meanwhile, as we shall see, an examiner can learn a great deal about a driver's attitude by skillful interview and by inspection of his past record.

What Can We Learn About the Driver?

Having decided what we should like to know about the automobile driver let us now consider what we can actually find out.

Knowledge Regarding Driving.—It is relatively simple to determine what the motorist knows about safe driving and the rules and signs and signals designated to encourage it. The chief aim here should be to test for a real knowledge and understanding rather than a mere memorization of words and sentences.

Car Manipulation.—It is also fairly easy to determine the ability of the driver to manipulate the vehicle. It is believed that there is much room for improvement in this direction. Certainly the ability to park a car or to shift gears on a hill does not provide much of an index as to whether the individual can avoid accidents. We want to know also, for example, whether he follows other cars too closely, whether he takes chances in passing on a slippery road, and how quickly and skillfully he stops in an emergency.

Physical and Mental Equipment.—While those applicants who are quite unfit to learn to drive a car constitute a very small percentage, they must be singled out. This is a secondary function of a driver's examination rather than the major function.

Examination Frequency.—Annual examinations for all drivers are unnecessary, but certain individuals with bad records should be examined frequently. One of the best uses of an examination is to study and measure the driver who has had accidents, find out his difficulty and attempt to cure it.

What Can We Afford to Learn About a Driver?

Theoretically our losses are severe enough to warrant our finding out almost everything we can about an automobilist. Practically, since we spend millions for highways but only thousands for safety, we must restrict our program to the bare essentials. Among the causes of accidents there is a definite concentration, so for reasons of economy in administration it would seem highly advisable to restrict our examinations to things having to do with the eight or ten principal causes of accidents and to those principles of driving which are most important from the accident standpoint.

Application of Examinations

Aside from the actual make-up of the examination the second most important thing is how it is used.

New Automobilists.—Since the majority of new applicants apparently turn out to be fair drivers, the purpose of this examination should be to educate them, to pick out any serious defects and correct them, and, after recommendations, to refuse licenses to the small percentage of those who cannot learn to drive safely. The effect of the mere requirement of an examination is obvious. The vast majority go down to take the examination with considerable timidity. Some admit that they are afraid and others are afraid to admit it. This is a significant point. When they are in that mood it is the best possible time to educate them.

Accident and Violation Repeaters.—The new driver has nothing against him on the record. In fact there is something in his favor—most of the drivers are able to keep out of trouble. There is really

less need to examine him thoroughly than there is to examine the repeater. The driver who has more convictions or accidents than the average has demonstrated that there is something wrong with his driving. He is the one who has the greatest need of a thorough examination. In fact, if insufficient money were available to examine thoroughly both new drivers and repeaters, it is felt that for the money invested the greater return would come from examining those who have demonstrated their deficiency. Furthermore, the administrator will encounter much less difficulty in stiffening and expanding examinations for repeaters than for new drivers. It is suggested that all additions to present examinations be started in their use on the repeater class.

The Place of the Eye in Drivers' Examinations

There can be no question but that the eye is of major importance in driving. Without eyes driving is impossible. The question then is not whether the eyes should be examined, but what characteristics of sight affect the accident situation. At the present time eye examinations usually cover visual acuity, field of vision and color blindness.

Accidents Due to Faulty Vision.—As far as the author can discover, the number of accidents due to faulty vision (as measured above) is negligible. Tests showed that accident-prone drivers have as good eyes as average drivers. In fact, special glasses have been placed on motorists with perfect eyesight to create distortion and it was found that distortion could be increased considerably without materially affecting the ability to avoid accidents. The ability to drive safely even though their windshields are foggy or the visibility is obstructed by snow or rain shows that many of us are able to compensate for poor visibility.

Motorists with Seriously Defective Vision.—The percentage of drivers whose vision is seriously impaired (from the viewpoint of driving) is probably very low. Those who can read only the largest letter on the Snellen chart may still not have a need for seeing clearly smaller items than that.

Status of Present Tests.—Strange as it may seem, our present eyesight tests appear to be doing us very little good. The percentage of those that the existing examination shows to be obviously

unfit is small. Of the present tests the following indicates the order of importance:

1. The field of vision test appears to have some real value, although the percentage having a restricted field of vision seems to be very small.

2. The visual acuity test appears to be of little value except in regard to the relatively few who probably cannot see the largest letter of the chart.

3. The color blind test appears to be the least valuable of all. Color blind operators have not demonstrated a tendency to have accidents. They compensate for this defect by watching traffic more closely. Our signs and signals are rapidly being standardized to a point where color blindness is not a serious point anyway.

Regarding present examinations, then, it would appear that the field of vision test should be continued, and some quick test for serious defect of eyesight should be given. Visual acuity should be studied in its relation to ability to judge speed and distance. The color blind test, if any, should be restricted to actual ability to see and interpret signs and signals. Further research should be made to see if some relationship can be found between certain other characteristics of the eye and accidents. It must naturally be recognized that an eye test, however, does have some psychological advantage. The point is that we should attempt to obtain as much practical value as possible at the same time.

Value of Eyes in Driving.—Since such items as visual acuity, field of vision, and color blindness are not a measure of the driver's ability to avoid accidents except in rare cases, let us consider just where the eye does fit into the driving picture.

It is believed that the visual ability of the eyes alone is not what affects the accident picture. It is not merely the picture which the eye presents to the driver which counts, but what that picture means to him, what he knows should be done about it, and whether he is willing to do it. Thus the problem now becomes one of a combination of the eye, the brain, and the hand. It is possible to test this so-called eye-hand co-ordination, but the present eye examinations do not do it.

Suggested tests which cover a combination of the eye and the brain follow. They are considered by the author to be of greater importance than current eye tests.

Ability to Recognize a Hazard

It should be obvious that an important ability of the driver who is able to avoid accidents is that of being able to recognize a hazard when he sees it. In this the eye plays an important part, but without the other facilities of the brain it is helpless.

For example, a man is driving down the roadway when he notices a parked car. It looks just like any other parked car—except that smoke is coming out of the exhaust. The man with the "safe eye" and the "safe brain" will immediately see the potential hazard: the car with the engine running may be just about to pull out in front of him.

A picture test showing a series of potential accident conditions has been used to determine the ability of the operator along this line. Such a test should cover such conditions as: blind intersections, bottle necks, curves, hills, slippery pavements, passing hazards.

Timing: Judging Speed and Distance

A large percentage of our accidents occur at the intersection and involve cross-movements. In almost all of these, faulty timing certainly must play an important part. This is particularly true under modern high speed conditions. The ability of the motorist to judge the speed of his own car and that of approaching cars comes into play continually. A condition far ahead may appear to be safe, but he must be able to forecast the condition as it will be when he arrives. This involves two sets of speeds and two sets of distances. Drivers differ greatly in their ability to estimate accurately these distances and speeds.

There have been several experiments on this point. Some have been carried out on the highway; others, in the laboratory. One involved two miniature electric trains, one of which travelled at a fixed speed. The speed of the other was controlled by the man being examined. The tracks crossed. The ability to avoid a collision was taken as a measure of timing ability.

Münsterberg, in 1912, carried out tests showing the reaction to complex situations involving pedestrians and street cars. He decided the lowest quarter on this test made poor drivers.

Since Münsterberg's pioneering investigations, considerable prog-

ress has been made in this direction, and it is believed that fairly practical simple methods of giving tests of timing ability can be developed.

Ability to See the Whole Picture at Once

At modern speeds it is necessary for the driver to see many things in addition to the mere roadway on which he is traveling. He must be able to see vehicles and pedestrians and to judge correctly their distance and rate of movement. He does not have time to focus his eye on each and every part of this picture. Thus the ability to see the details of the picture at a glance is an essential.

There are tests to measure this ability. Several experiments have been carried out in this direction. This involved complex situations and the individual's reactions were recorded. These took the form of responses to changing street scenes and to lights of different color in different locations.

Reaction Time

At high speeds, reaction time becomes important—not only how quickly the driver can get into action and stop his car, but how quickly he sees the changing details of the picture ahead of him and how quickly it tells him its story. It is possible to develop tests which will measure this particularly. Motion pictures of highway conditions have been used in Paris and elsewhere instead of laboratory signals.

Summary of Some Tests

In 1925 Viteles developed an examination for street car operators in which he used the following:

1. Proper reaction to objects in field of vision.
2. Ability to judge speed and distance—anticipate the movements of vehicles and pedestrians.
3. Promptness in meeting an emergency.
4. Mechanical aptitude.
5. Special qualities, information and courtesy.
6. General reliability.

He used a set of colored lights on a board 4 x 5 feet, and provided distraction by a white light on the side.

A rotating drum on which is a diagram of a complicated street system has been used in Germany. The operator was required to follow a given street.

It appears from a study of an accident-prone group that they have as good vision as normal individuals. Indeed defects and anomalies showed very slight effect on operation.

The Position of Motor Vehicle Commissioners

The Motor Vehicle Commissioners in states having standard license laws have done very well with present examinations, considering the facilities at hand. The unreasonableness of the present situation, where millions are spent for faster roads and but thousands for safety on these roads, will eventually be changed. Until that time, about all they will be able to do will be to increase their selectivity and concentrate on those main items which are known to cause most of the accidents. It is quite possible that the best place for them to extend and improve on present practice is on the repeaters who are few in number and who have provided a demonstration of their inability to avoid accidents which warrants a more thorough examination. Certain improvements can also be made in the direction of standardizing whatever examinations are now given, and the corrections; and to expand the educational features which are of primary importance, particularly in the absence of schools for driving. Improvements and expansion of examinations must be gradual. Considerable efforts are required to keep the public educated up to them.

Suggestions for a Modern Examination

The following are suggestions for a modern examination to be applied in the manner previously described.

Standardized Road Test.—No matter how simple the road test, it should be thoroughly standardized, both as to what the driver is to do, and as to what the examiner is to record. All the points to be covered should be listed. Standard practice in scoring each point should be established. This is the only way to avoid differences in judgment of individual examiners.

Under the present economic pressure the test must be short and so should cover only the most important features.

The standard test, developed under the auspices of the National Research Council, by Dr. A. R. Lauer of the Department of Psychology at Iowa State University, can well be used as a starting point.

Eyesight Test.—It is recommended that of the points now tested, those having to do with restricted field of vision be emphasized the most. Only two states, Massachusetts and Oregon, are now using this test. It is recommended that the visual acuity test be simplified and used largely to pick out those who are dangerously defective. It is recommended that the color blind test be restricted to actual signs and signals or discarded entirely. This will leave more time for the following combination eye and brain tests showing:

1. Ability of the driver to recognize a hazard.
2. The timing of the driver (his ability to judge speed and distance).
3. The ability of the driver to see "the whole picture" and not merely one part of it.
4. The reaction time of the driver to pictures which show a hazard.

Written Test.—It is strongly recommended that a written or picture test be given. In this test the major emphasis should be placed upon the educational features. The test should be designed to show an understanding of what actually constitutes safe driving rather than of the technical legislation provided to require it. Attempts to have drivers learn the details and technicalities of the law should be minimized.

Application of Examination.—Examinations should be used much more for repeaters than they are now. They should be used on all new drivers: first, for their educational value; and, second, to bar the small percentage who actually cannot drive safely. All tests should be standardized and conducted under controlled conditions.

Conclusion

The potential value of improved examinations has been pointed out. Extension of their use is recommended.

While the present eyesight examinations are not believed to have

much correlation with tendencies to have or avoid accidents, this belief in no way minimizes the importance of certain examinations having to do with the way a driver understands, interprets, and responds to what he sees. Since the human being is able to compensate marvelously for a defect in one ability by the expansion of another, he should be studied as a unit. A list of suggestions along this line has been made.

Only 16 states have a drivers' license law and but 10 of these have a good one. While there is no question but that further research is required, it is felt that the greatest need today is to get standardized examinations more widely and thoroughly used.

Trachoma in the Native White Population of the United States

C. E. Rice, M.D., and Avery A. Drake, M.D.

TRACHOMA patients who are treated adequately do not become blind, although many suffer impaired vision. The large majority of trachoma patients either do not seek treatment at all, or do so only after their vision has been impaired

TRACHOMA, meaning roughness, is primarily a granular inflammation of the conjunctiva of the eyelid. It is differentiated from other conditions which produce granules or follicles of the conjunctiva principally by its chronic course and involvement of the cornea, usually early in the course of the disease.

At the present time trachoma is epidemic[1] in Egypt, China, Japan, India, Palestine, and Russia. It is endemic in Roumania, Czechoslovakia, Yugoslavia, Poland, Bulgaria, Italy and Spain. In the United States it is endemic in Missouri, Tennessee, Kentucky, Arkansas, southern Illinois and West Virginia. Sporadic cases are found in many other states.

From the time that the United States Public Health Service, in co-operation with certain state departments of health, entered upon a program aimed at eradication of trachoma, a large number of individuals with trachoma have been observed: in Kentucky, 9,087 from 1913 to 1933; in Tennessee, 3,653 from 1916 to 1933; in Missouri, 5,388 from 1923 to 1933; in Arkansas, 1,123 from 1922 to 1928; in West Virginia, 655 from 1915 to 1918. At the request of the Illinois State Board of Health, nine diagnostic clinics were held, at intervals, during 1930 and 1931 by the Public Health Service. These were held in southern Illinois where the disease is endemic. Of 858 individuals examined, 314 were found to have trachoma.

Rosenau[2] in his book, *Preventive Medicine and Hygiene*, states that trachoma is frequently encountered among the white population of some of our southern and midwestern states and that it is endemic in the poorer sections of all the large cities. This statement is contrary to our experience. Trachoma is very rare in our large cities today, but it is endemic in many rural sections of the states mentioned above.

The victim of trachoma has congested eyes, a feeling of roughness, as if something were scratching the eyeballs, sensitiveness to light, a watery discharge and, after a time, impaired vision. After many years the lids may become distorted (incurved) causing the lashes to rub the cornea.

On everting the lids of early cases of trachoma, the mucous membrane is seen to be highly inflamed and thickened; follicles are present in the thickened mucous membrane of both upper and lower lid. The small vessels seen in the healthy palpebral conjunctiva are absent. Trachomatous changes occur primarily in the conjunctiva of the eyelids. Such changes eventuate in scar tissue which may be seen even fifty years later.

Trachoma very early involves the cornea which should always be carefully studied. The earliest changes occur usually within three months and are manifested by cellular infiltration of the corneal tissue and usually vascular penetration of the cornea. This is known as "pannus" which is practically pathognomonic of trachoma.[3] Corneal ulcers may form in early life. We have seen severe trachomatous ulceration, with impending perforation of the cornea, in a female infant of 18 months.

Corneal involvement in trachoma should not be thought of as a complication but as an integral part of the disease in humans. It may continue after the conjunctival disease has been entirely arrested. There is a wide variation in the susceptibility of corneas to involvement, a variation which has never received adequate explanation. Corneal trachoma with the incident failure of sight renders the disease a problem in public health.

Trachoma probably originates exclusively from the secretions of another eye affected with the disease. As a rule, there is a history of close contact with infected individuals as in the case of large families living in contracted quarters and using common towels,

wash basins, etc. Under conditions of school life, spread of the disease is limited and it seems unwise to exclude trachomatous children from school, provided they are under treatment.

The disease usually has its beginning in childhood or early adult life, the infection coming from the parents or other members of the family or from a marital partner.

In view of the fact that trachoma is so prevalent among persons of low economic status, living under wretched, unhygienic conditions, it has been contended that trachoma may be a food deficiency disease.[4] Our observations lend no support to this view. When one considers that trachoma is widely prevalent among professional wrestlers, it does not seem likely that the food deficiency theory is well founded. Undernourishment is not particularly manifest in the trachoma cases in Missouri, Kentucky and Tennessee. An infestation with hookworm has never been seen in a Missouri case. Hookworm infestation, however, is quite prevalent among the Kentucky trachoma cases.[5]

In 1927 Noguchi[6] described an organism, *Bacterium granulosis*, which he believed to be the cause of trachoma. Other observers have often found this organism, but its etiologic relationship to the disease is still in question. The inclusion bodies of von Prowazek that are often seen in stained scrapings from the trachomatous conjunctiva have been reproduced artificially[7] by instilling certain bacteria and chemicals into a normal conjunctival sac. Friedenwald[8] states that these inclusion bodies are rarely seen in trachoma in this country. In a series of 230 cases intensively studied by Bengtson[9] at Rolla, Missouri, she found inclusion bodies in 45 per cent. It cannot be said, therefore, that the problem of etiology has been solved.

Trachoma is found in all age groups. This is in striking contrast with folliculosis, a disease resembling trachoma. Folliculosis occurs predominantly in young children; beyond the age of 14 it is seldom seen.

Since our work in Missouri was started, in 1923, we have surveyed over 5,000 cases. In this group of cases it is found that the males predominate. In three contiguous counties where intensive field work was done, 1,151 cases of trachoma were found, of which 60.4 per cent were males. It is possible that some cases in females were

missed, which would have been found by a more careful house to house search. However, the 1,151 cases mentioned were not selected in any way and can really be considered a fair random sample of the trachoma occurring in a rural area of Missouri of over 2,500 square miles, with a population of 51,000.

There is considerable variation in the severity of trachoma the world over, and even within the borders of our own country. Trachoma among the Chinese[10] probably does less damage than among the white population of Missouri and Arkansas. The number of blind eyes and entropions per 100 cases of the disease can be used as a measure of the virulence of trachoma. Studies have been made in five areas of this country based on such measurement. These areas, in the order of decreasing virulence, are[11]: Missouri, Arkansas, Kentucky, Tennessee and Georgia.

The diagnosis of trachoma must be made solely on the clinical signs. There is no difference histologically[12] between the follicle of trachoma and the follicle of benign folliculosis. The laboratory, therefore, offers no help in differential diagnosis. Statistics on trachoma emanating from states where trachoma is reportable are very untrustworthy, owing to the inability of many examiners to make a correct diagnosis. There are several conditions simulating trachoma, such as vernal catarrh, folliculosis and follicular conjunctivitis. The last two are often mistaken for trachoma.

A thickened and inflamed mucous membrane at the base of the follicle should make one suspicious of trachoma. The upper part of the cornea should be examined by focal illumination and high magnification. In true trachoma there will sooner or later be found infiltration and vascular invasion. There is no need for a hurried diagnosis. One should make frequent inspections of doubtful cases over a period of several weeks or the therapeutic test may be applied. Suspected cases may be placed on some mild astringent solution, such as 0.2 per cent zinc sulphate or 2 per cent mercurochrome, continued for six or eight weeks. Complete recovery would then definitely place the conjunctival inflammation in the category of a benign follicular disease. If, on the contrary, the condition has remained at a standstill or has grown worse, the health official should strongly suspect trachoma and call upon the eye specialists for confirmation of his suspicions.

In one locality, a large number of public school pupils showed conjunctival and palpebral congestion with the formation of follicles, giving rise to great concern among the local physicians, parents and teachers. The therapeutic test was applied by the school teachers themselves after being instructed by physicians.[13] Twice each day the affected pupils received instillations of zinc sulphate solution or 2 per cent mercurochrome. At the end of six weeks expert examination proved that nearly all had recovered.

Trachoma can produce blindness or near blindness very early in life. Among 5,000 odd cases observed in Missouri, one out of every seven or eight had vision reduced to 20/200 or less. Of these, approximately one-third were below the age of 40 years and about 10 per cent were below the age of 20 years. In Missouri there is found one trachoma blind pensioner to every 26 cases of trachoma.[14]

But there is a brighter side of the picture. Many individuals examined in field clinics and in the out-patient clinic at the hospital show the presence of scar tissue in the lid conjunctiva, the indubitable sign of a once active trachoma. Often there has been no treatment beyond home remedies; nevertheless, the disease has run its course, and recovery has ensued without damage to vision.

Missouri has a blind pension law which allows $25 a month to each blind citizen. On January 1, 1933, there were 3,885 blind pensioners. Of these, 761, or 19.5 per cent, were blind from trachoma. Trachoma is the greatest single cause of blindness in Missouri, and is costing $228,300 a year in blind pensions alone. Moreover, there is a great reservoir of citizens who are approaching blindness from this cause. With many of these we have never made contacts in the almost ten years of trachoma work in this state. From this reservoir there will come for several years additions to the state blind pension roll.

The program as carried out by the United States Public Health Service in co-operation with various state health departments is a threefold one, based on: (1) Case finding, which is accomplished largely by the trachoma field nurse; (2) education as to proper personal and family hygiene (this is accomplished by the trachoma field nurse in the home, and by the hospitalization of the individual patient); and (3) treatment of the active cases as given

at the hospital, the out-patient clinic at the hospital, and the field clinics held from time to time in various parts of the state.

The work in the field is mainly carried on by public health nurses who have been especially trained. The work of the trachoma field nurse plays a very important part in the program. She visits homes and schools and examines the eyes of those with whom she comes in contact, noting all cases suspected of trachoma. It has been found that school examinations alone do not give a true picture of the prevalence of trachoma in any one community, for the reason that the child with trachoma soon drops out of school. This has been found true repeatedly. The field nurse instructs trachoma families about personal and family hygiene, and gains their confidence and good will. One of her duties is to organize diagnostic and treatment clinics at which new cases are examined and advised to come in regularly for treatment or to enter the hospital. Operative clinics are held in schoolhouses, court houses, or churches which are converted into temporary hospitals by the installation of army cots. Here the patients who are operated upon are kept for one week. Often the women of the community are most helpful in preparing and serving meals. The field nurse keeps in touch with former hospital patients in her territory and, if they again require treatment, urges them either to go to the hospital or to come to the clinics. It is often difficult to secure the consent of parents to permit their children to go to the hospital, and repeated visits by the nurse may be necessary before the goal is reached.

MacCallan[15] in the early part of this century started the English campaign against trachoma in Egypt by establishing small temporary field hospitals. A somewhat similar plan was adopted by Surgeon John McMullen of the United States Public Health Service, when, in 1913, he inaugurated the campaign against trachoma. Today this plan is still followed and, in the heart of endemic areas, small temporary hospitals are established, partly supported by the interested state health department and partly by the United States Public Health Service. They are operated solely for the treatment of trachoma, and without charge to the patient for board, lodging and professional care. However, the patient is required to furnish his transportation to and from

the hospital, and to pay for the laundering of his personal clothing. In Kentucky, the Louisville and Nashville Railroad has for many years furnished free transportation for trachoma patients to and from the hospital.

The use of individual towels and soap is enforced, and the patient's hygienic habits are supervised. Thus, new standards of personal hygiene are developed and new ambitions are aroused; and on the return of the patient to his home, his family benefits from his newly acquired knowledge.

The number of drugs and other agents that have been used in the treatment of trachoma is legend. Only a few have proved useful and have stood the test of time. No specific treatment has ever been found. Nature heals trachoma by producing scar tissue in the eyelids, and man's most successful efforts to this end have been secured by the use of agents which, while not unduly traumatizing the eyes, stimulate the production of scar tissue in the subconjunctival tissue of the lids.

Our general routine treatment of trachoma at the hospitals is as follows: At 6.30 A. M. all patients' eyes are irrigated with a solution of 90 grams of boric acid powder and 30 grams of sodium chloride to 4 liters of water. At 9 A. M. all patients are examined and treated by one of the staff physicians. We usually use 2 per cent silver nitrate, copper sulphate stick, boric acid powder or 7 per cent trichloracetic acid in all cases of acute and subacute trachoma. After the use of one of these on the well everted lid the conjunctival sac is flooded with the irrigating solution. At 11:15 A. M. the irrigation is repeated, followed by drops of a solution of 120 grams of boric acid powder and 8 grams of zinc sulphate to 4 liters of water. This routine is repeated at 4:15 P. M.

There are several operations which we have found of value. Grattage is practised when the lids exhibit exuberant granulations. Under holocaine and novocaine anesthesia, the conjunctival surface is carefully scraped with a dull scalpel, followed by a brisk rubbing with a dry piece of gauze. Then 20 per cent silvol is instilled and ice water compresses are applied to the eyes for one-half to one hour. Post-operative treatment consists of frequent irrigations and the application of 20 per cent silvol four times daily, until the operative reaction has subsided and all slough has

disappeared from the lids. Then the medical treatment outlined above is begun.

Canthoplasty is another operation that we find extremely useful. It is indicated in eyes with narrowed palpebral apertures, in blepharospasm, frequently in corneal ulceration, and in sensitive eyes which are irritated by the scraping action of the roughened lids. Canthoplasty and grattage are frequently performed at the same time.

An operation for entropion is frequently necessary. We prefer a modified Ewing operation, in which the incision is through the conjunctiva and tarsus, to any type which involves incisions on the skin.

Excision of the tarsal cartilage has a useful place in the surgery of trachoma. We do not agree with the view that its removal is indicated because it harbors infection, and that consequently re-infection is prevented by this procedure. When the tarsus is concave and rough from cicatricial changes, it is best to get rid of it. Usually it is best to remove the overlying conjunctiva, but when that membrane is shrunken, it is wise to spare it as much as possible. Under these conditions we prefer a partial excision of the cartilage, as advocated by John Green.[16]

In cases where there are a few aberrant lashes which curve inward and continually rub the cornea, their destruction by the electric needle is indicated. This procedure is extremely useful in select cases, but should not be used as a substitute for an entropion operation.

The period of hospital residence averages 29 days. The cost per patient per day was $2.08 during 1932, at the Trachoma Hospital at Rolla. Approximately 23 per cent of all patients return to the hospital two or more times with recurrences of the disease.

Trachoma eradication work is now being carried on by the United States Public Health Service in co-operation with the state health departments of Georgia, Kentucky, Tennessee and Missouri. The trachoma work in Tennessee at present is carried on by a field unit of one physician and two nurses with headquarters in the small mountain town of Gainesboro. One nurse is almost constantly employed in searching for new cases of trachoma; the physician and one nurse hold treatment clinics at

regular weekly intervals in several nearby counties. Six hospital beds are available at Gainesboro for the more severe cases.

In Kentucky the trachoma field hospital is located at Richmond in a large colonial mansion owned by the Kentucky State Medical Society. It has been possible in that state to interest and train several county health officers in treating the milder cases of trachoma at regular weekly clinics.

Co-operation and encouragement have been given us by ophthalmologists, as it is realized that our program in no way infringes on the rights of the private practitioner. Many of our patients are sent or brought to us by their family physicians and many are referred by ophthalmologists.

The patient with trachoma needs general as well as special care, and nearly always he or she is handicapped by lack of money. If proper provisions for this care are not made, then the state is likely to have a helpless blind man or woman on its hands. Trachoma patients adequately treated do not go blind, though many suffer impaired vision in spite of all treatment. The large majority of trachoma patients either do not seek treatment at all, or do so only after their vision has been more or less impaired. Early treatment before the disease has gained a firm foothold, and before vision has become impaired, would save these patients untold misery and would cost the state and federal governments far less. It is thus seen how vitally necessary it is to uncover as many early trachoma cases as possible. To do this requires house-to-house visiting, often in remote and sparsely populated regions. This explains why field nurses are indispensable.

We wish to express our thanks to Dr. John Green of St. Louis for having read this paper and making many helpful suggestions.

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Reading Ability of Sight-Saving Class Pupils in Cleveland, Ohio

Olive S. Peck

MOST sight-saving class pupils, when given enough time, read comprehendingly within the range of their mental ability, regardless of eye defects

FOR some time teachers of sight-saving classes have hoped to have some definite basis for measuring the reading ability of their pupils. Since all reading tests were printed in small type, and because of the enormous amount of work involved in making copies of these tests, it was out of the question to do any testing except in individual cases. With the appearance of a large-type typewriter, which cuts a stencil, the problem of reproducing these tests was solved to a great extent.

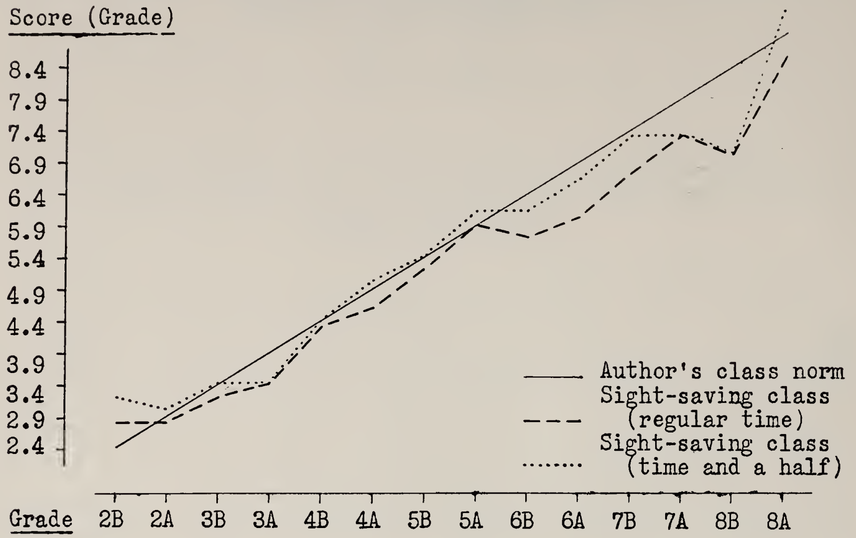
Since our aim in teaching sight-saving class children to read is to enable them to supplement their knowledge through the use of the printed page, a test of reading comprehension was selected as the best check on results. Reading as an occupation for leisure time is not encouraged. Because of the limited amount of large type material and the nature of the pupils' eye conditions, the reading training is intensive rather than extensive. The emphasis on reading is for information rather than for pleasure.

Permission was granted by the publishers of the Stanford Achievement Test in Reading to reproduce Form A of this test in large type for use in the Cleveland sight-saving classes. The test is in three parts: paragraph meaning, sentence meaning, and word meaning. In January, 1932, the test was given for the first time to every pupil in the sight-saving classes of Cleveland, in grades 2B through 9A. It was repeated in January, 1933. All of the testing was done by the writer in order to secure uniformity in administering the tests. (See Charts 1 and 2.)

Charts 1 and 2

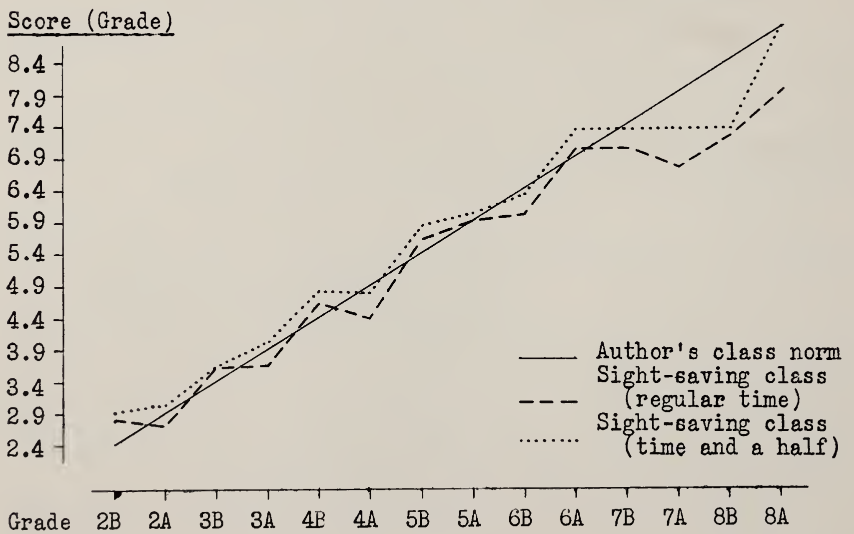
Total Reading Score - January, 1932

Median score of sight-saving class pupils—regular time and time and a half—compared with author's norm, by grade



Total Reading Score - January, 1933

Median score of sight-saving class pupils—regular time and time and a half—compared with author's norm, by grade



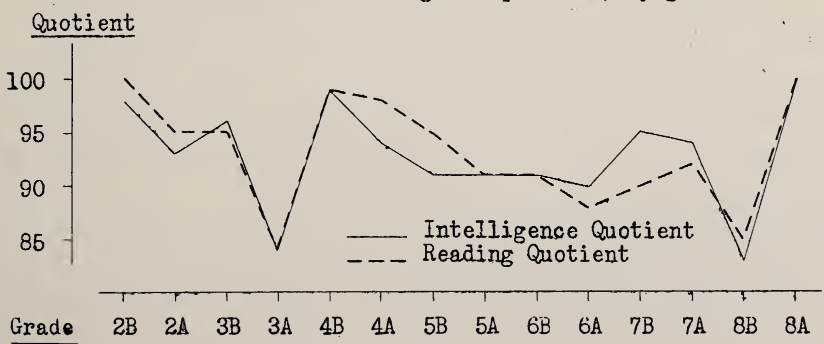
In giving the test, the question of time allowance was considered. It was decided to score the tests on the basis of the time allowed to children of regular grades and then to have a separate score on the basis of regular time plus one-half additional time. This longer time was considered to be enough so that each child could read as much as he was mentally capable of doing. The test covered twenty-four pages instead of the usual seven pages of ordinary size print. The question of extra time had to be decided rather arbitrarily as the exact amount of additional time necessary would depend upon the eye condition of the individual child. It was believed that the author of the test had allowed enough time to enable the child to work up to his mental level. Therefore, a liberal allowance of extra time was allowed the sight-saving class children so that they, too, could work up to their mental level.

The results of the tests are presented in the accompanying tables and charts. For the convenience of readers who may not be familiar with the technique of scoring such tests, it should be stated that in each of the tests the achievements are rated on a grade scale similar to the usual school grading system. According to the findings of the author of the test, pupils in grade 2B should show an average reading ability, early in January, of grade 2.4; those in grade 2A, of grade 2.9; those in 3B, of grade 3.4, etc. These standard findings, referred to as author's class norm in the charts, are made the basis of comparison for the findings of the tests as applied to sight-saving class pupils. The average used for

Chart 3

Reading Test and Intelligence Test - Regular Time - January, 1932

Median reading quotient of sight-saving class pupils, compared with median intelligence quotient, by grade

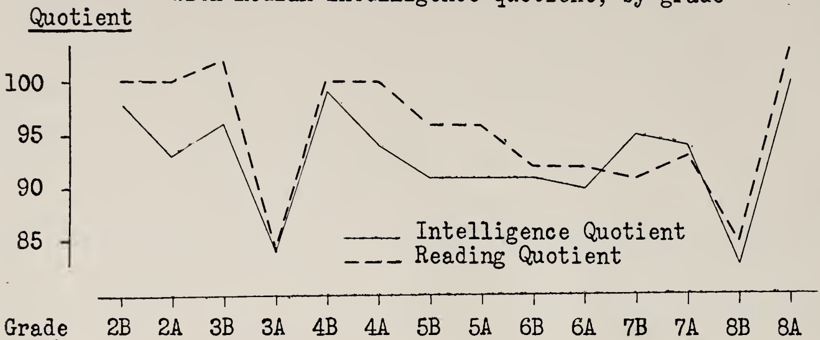


the sight-saving class pupils is the median (mid-score of all scores arranged in order of size) for each grade group.

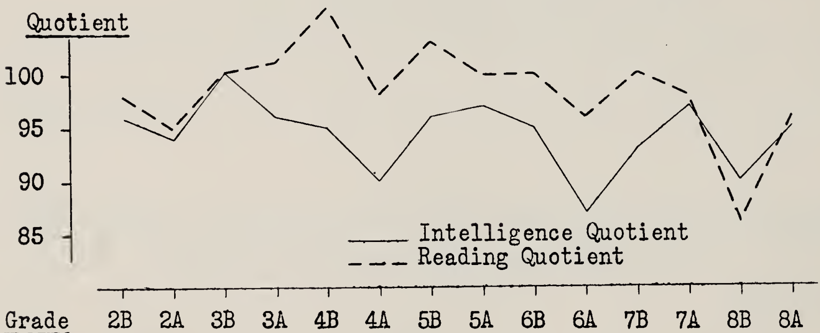
Results of the entire reading test are shown both as grade scores and as reading quotients. The reading quotient, which is a

Charts 4 and 5

Reading Test and Intelligence Test - Time and a Half - January, 1932
Median reading quotient of sight-saving class pupils, compared with median intelligence quotient, by grade



Reading Test and Intelligence Test - Time and a Half - January, 1933
Median reading quotient of sight-saving class pupils, compared with median intelligence quotient, by grade



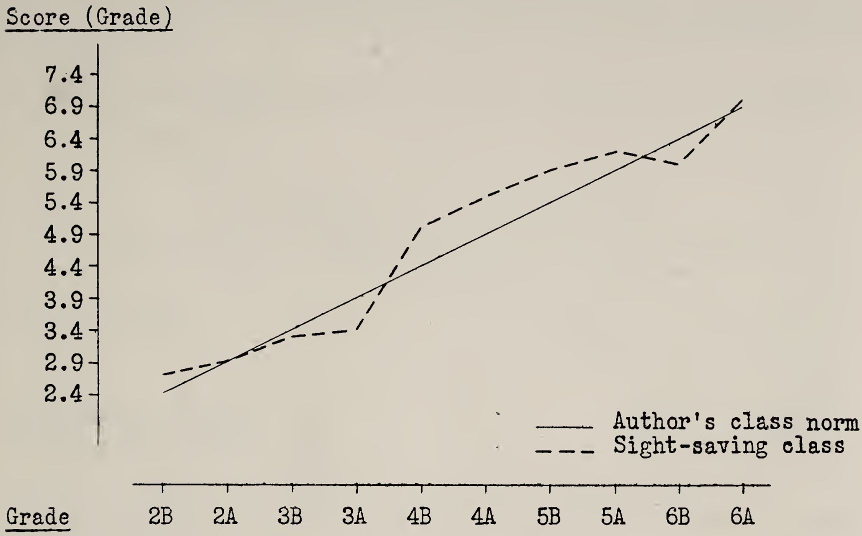
percentage ratio of actual achievement in months to standard achievement in months (norm), was computed for the purpose of making comparisons with intelligence quotients which are similarly arrived at. (See Tables I and II.)

The relation of the median intelligence quotient to the median reading quotient on both the regular time and extended time shows that teaching methods have been effective. (See Charts 3, 4, and 5.)

Charts 6 and 7

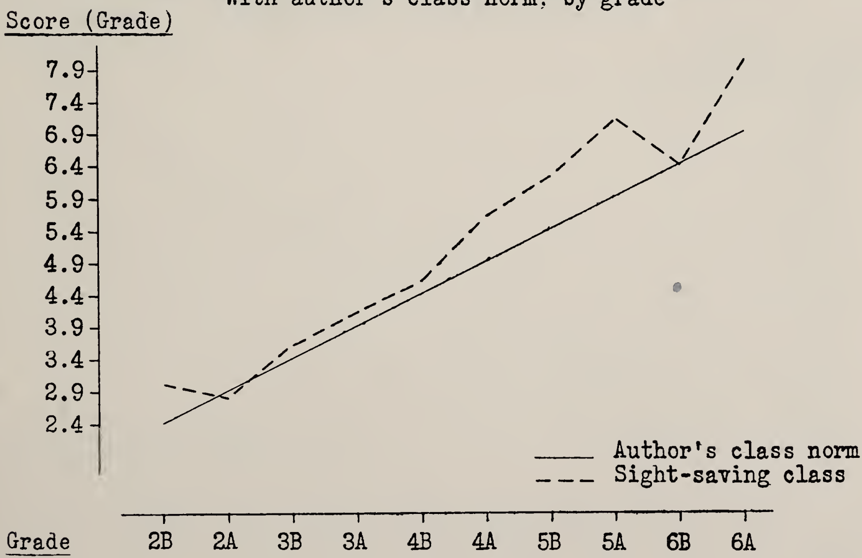
Paragraph Meaning Test - January, 1932

Median score of sight-saving class pupils, compared with author's class norm, by grade



Paragraph Meaning Test - January, 1933

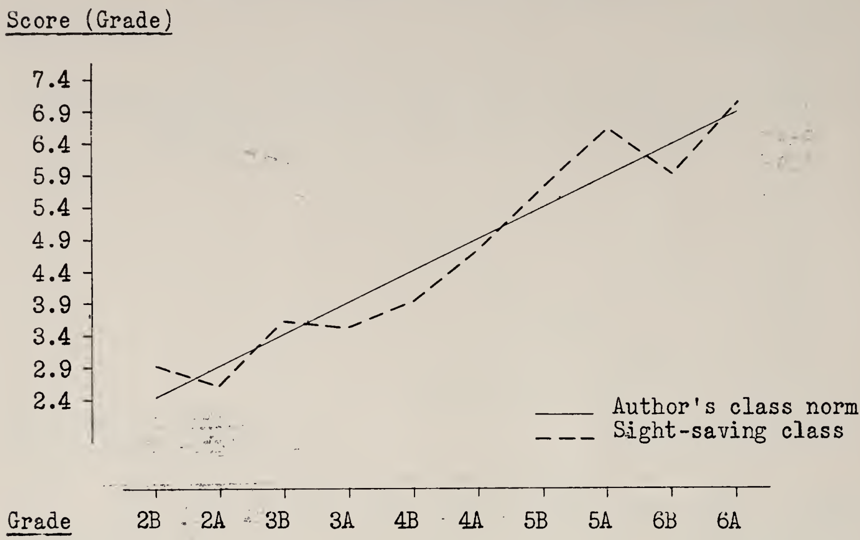
Median score of sight-saving class pupils, compared with author's class norm, by grade



Charts 8 and 9

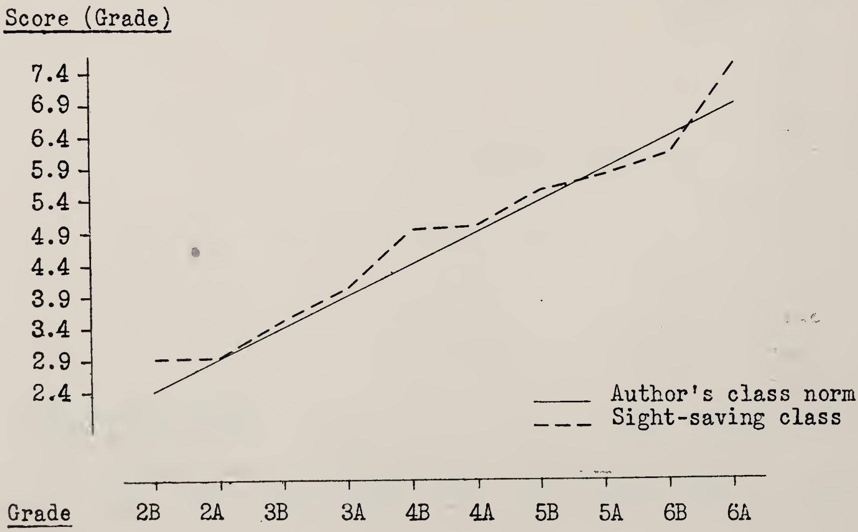
Sentence Meaning Test - January, 1932

Median score of sight-saving class pupils, compared with author's class norm, by grade



Sentence Meaning Test - January, 1933

Median score of sight-saving class pupils, compared with author's class norm, by grade



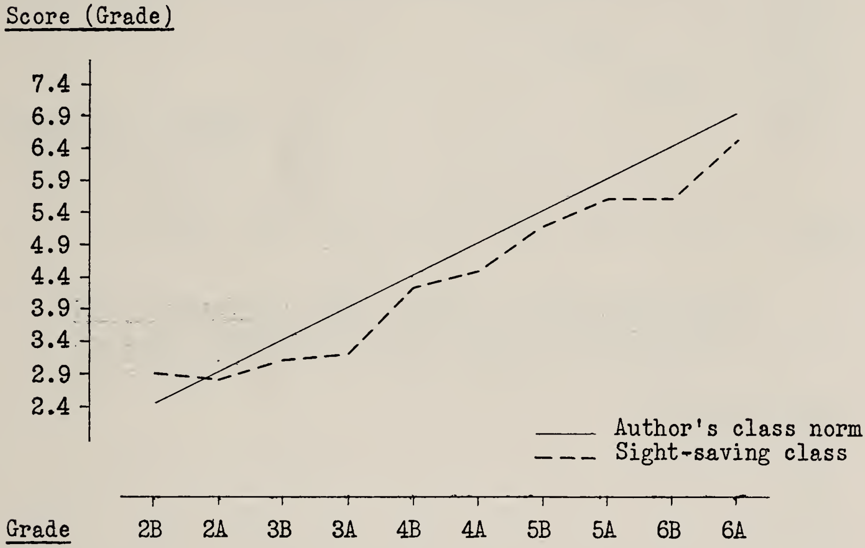
The intelligence quotients are based on Binet tests given to the individual child by a clinical psychologist.

It is interesting to note that, since time is known to be a great factor in seeing, these pupils, regardless of their eye defects, raised the level of their reading quotients in most grades, when extra time was given.

In the tests made in January, 1933, the first six grades were a

Chart 10

Word Meaning Test - January, 1932
Median score of sight-saving class pupils, compared with author's class norm, by grade



total of fifty months above the author's norm in paragraph meaning, fifteen months above in sentence meaning, and four months above in word meaning.* (See Charts.) Most of the individual grades were a little below the author's norm in word meaning.

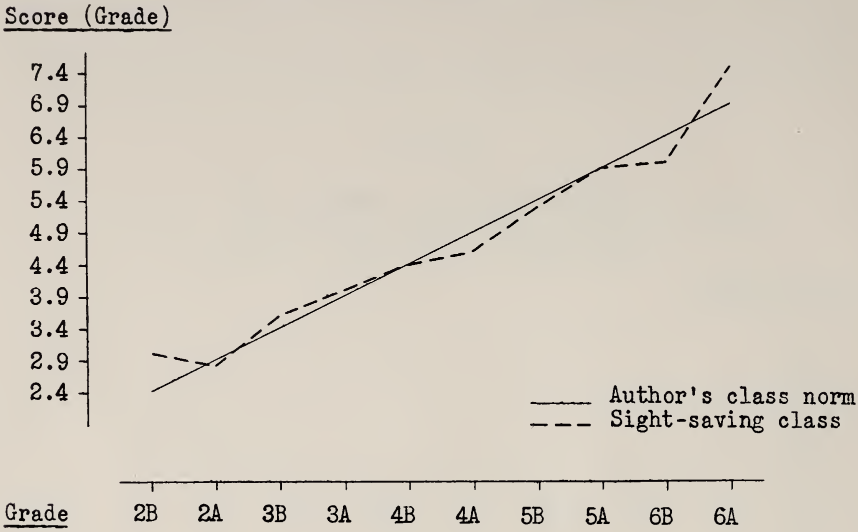
One year ago, when the test was given, the first six grades were a total of eleven months above the author's norm in paragraph meaning, two months above in sentence meaning, twenty-three months below in word meaning.

* The unitary score, or summarizing score, used for purposes of comparison is unconventional, but seems to be useful in this study.

Charts 11 and 12

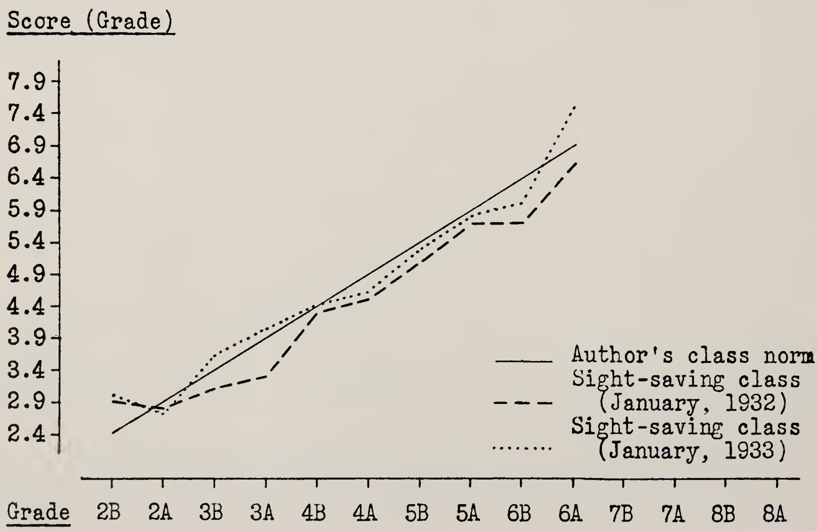
Word Meaning Test - January, 1933

Median score of sight-saving class pupils, compared with author's class norm, by grade



Word Meaning Test - January, 1932, and January, 1933

Median score of sight-saving class pupils—time and a half—compared with author's class norm, by grade



The results at that time showed that some of the grades were below the author's norm in word meaning, indicating a poor vocabulary. (See Chart 10.) This was thought to be due to:

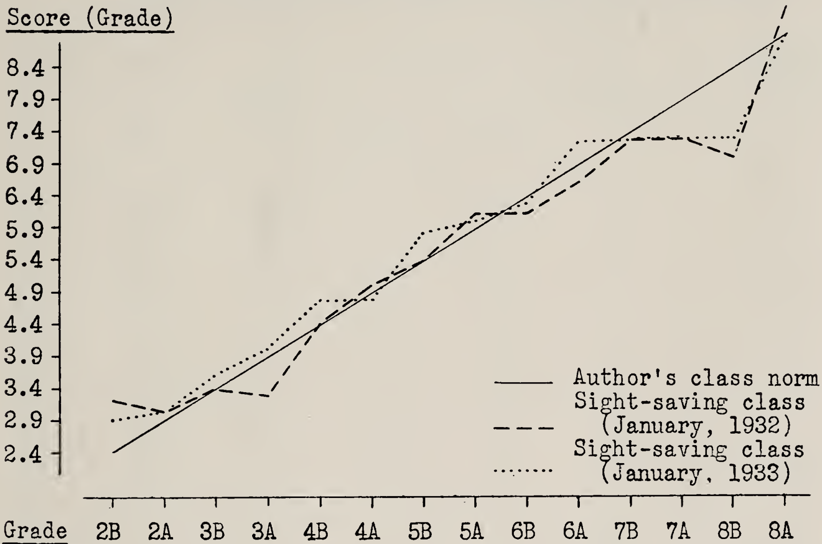
1. Lack of varied reading experience due to an eye difficulty.
2. Use of foreign language in the home.

A definite attempt toward vocabulary building was recommended. Since by the very nature of the eye difficulty, these

Chart 13

Total Reading Score - January, 1932, and January, 1933

Median score of sight-saving class pupils—time and a half—compared with author's class norm, by grade



children were limited in reading experience, an attempt to make compensation in the following ways was suggested:

1. Reading more to the children in school.
2. Paying special attention to oral language, reproducing stories they have heard.
3. Encouraging children to attend story hour groups at libraries, etc.
4. Encouraging parents to read aloud to the children at home.

The improvement secured by special attention to this phase of reading is shown by the graph which compares the median class standing in word meaning for 1932 and for 1933. (See Chart 12.)

An individual record of the results was filed for each child. On this card were placed the following data: chronological age, mental age, reading age, and class standing for the test, as a whole, for each year. A further record was made of the standing in the separate parts of the test—paragraph meaning, sentence meaning and word meaning. These records were kept both for regular

Table I

SUMMARY OF RESULTS OF READING TESTS GIVEN TO SIGHT-SAVING CLASS PUPILS, CLEVELAND, OHIO. JANUARY, 1932

Number pupils tested	Grade	Author's class norm (grade level)	Median score of sight-saving class pupils				
			Grade level		Intelligence quotient	Reading quotient	
			Regular time	Time and a half		Regular time	Time and a half
11	2B	2.4	2.8	3.2	98	100	100
16	2A	2.9	2.8	3.0	93	95	100
18	3B	3.4	3.2	3.4	96	95	102
11	3A	3.9	3.3	3.3	84	84	84
20	4B	4.4	4.3	4.4	99	99	100
16	4A	4.9	4.6	5.0	94	98	100
18	5B	5.4	5.2	5.4	91	95	96
13	5A	5.9	5.9	6.1	91	91	96
17	6B	6.4	5.7	6.1	91	91	92
12	6A	6.9	6.0	6.6	90	88	92
13	7B	7.4	6.7	7.3	95	90	91
18	7A	7.9	7.3	7.3	94	92	93
12	8B	8.4	7.0	7.0	83	85	85
9	8A	8.9	8.5	9.3	100	100	103
21	9B	9.4	8.7	8.8	97	96	97
9	9A	9.8	8.8	9.7	98	96	97

time and the extended time in order to determine the amount of gain in reading accomplishment resulting from the added time.

The record of each child was discussed in detail with the teacher. If the child was up to grade, no specific additional work needed to be undertaken in reading. The pupil who was below grade was the object of detailed study in the attempt to work out a method which would help to strengthen his reading. The number of months of reading progress for each child in the year's interval

between tests was of great interest and help to the teachers in planning a future reading program.

It is hoped that it will be possible, this year, to follow up this achievement test by giving diagnostic tests of oral reading to those pupils who were below grade, in an effort to determine the source of the reading difficulties which are not necessarily due to

Table II

Summary of Results of Reading Tests Given to Sight-Saving Class Pupils, Cleveland, Ohio. January, 1933

Number pupils tested	Grade	Author's class norm (grade level)	Median score of sight-saving class pupils			
			Grade level		Intelligence quotient	Reading quotient
			Regular time	Time and a half		Time and a half
15	2B	2.4	2.8	2.9	96	98
14	2A	2.9	2.7	3.0	94	95
15	3B	3.4	3.6	3.6	100	100
22	3A	3.9	3.7	4.0	96	101
13	4B	4.4	4.6	4.8	95	106
18	4A	4.9	4.4	4.8	90	98
19	5B	5.4	5.6	5.8	96	103
15	5A	5.9	5.9	6.0	97	100
14	6B	6.4	6.0	6.3	95	100
12	6A	6.9	7.0	7.3	87	96
12	7B	7.4	7.0	7.3	93	100
11	7A	7.9	6.7	7.3	97	98
12	8B	8.4	7.2	7.3	90	86
17	8A	8.9	7.9	8.9	95	96
12	9B	9.4	9.0	9.0	95	100
6	9A	9.8	9.3	9.5	103	104

defective sight, but to incorrect reading habits which may prove to be remediable under proper treatment. Such an analysis of reading difficulties is, of course, too detailed to be used for children whose reading is already satisfactory.

Since it has been found that in regular classes some of the frequent causes of slow reading are lip movement, inability to phrase properly, short eye span, and irregular eye movements, it might be expected that, by nature of the eye defects, nearly every

sight-saving class child would be a slower reader because every unfavorable factor except lip movement would be contributing to produce a slower rate of reading.

The results of these tests show that most of the sight-saving class pupils, when given enough time, read comprehendingly within the range of their mental ability, regardless of the eye defect. Since many sight-saving class pupils are failures in reading in the regular grades before being referred to the sight-saving classes, these results are doubtless due, in large measure, to the use of type suited to the eye condition, to careful reading instruction definitely adapted to the needs of the individual child, and to scientifically planned lighting conditions.

Editorials

Eye Injuries in Automobile Accidents

THERE could be nothing more serious and more dramatic than the sudden loss of sight through accident.

During the twenty-five years of organized work for the prevention of blindness, there has been a steady decrease in blindness from eye diseases of all kinds; yet blindness caused by accidents has been steadily increasing. This is due partly to the rapid mechanization of our industrial life.

It may be stated as a general principle that wherever there are accidents, there are eye hazards. Particularly is this true where such accidents are the results of explosions and of flying particles. Automobile accidents of all kinds result in a fairly large percentage of eye injuries, and many of these eye injuries are produced by flying particles of glass. Unfortunately, no records have been kept on a large scale showing the exact percentage of these injuries. From conferences with numerous eye physicians and safety engineers, we know that the aggregate of such injuries is sufficiently large to merit careful consideration and the elimination of the cause, if possible.

The National Society for the Prevention of Blindness co-operates with all agencies interested in the reduction of eye hazards, since a reduction of general accidents will result in a reduction of eye tragedies. Several years ago, the Society collected reports of 4,456 eye injuries from accidents. Of these, 381, or 8.5 per cent, were injuries resulting from automobile accidents, most of them caused by shatterable glass used in the cars.

Estimates of the frequency of serious injuries resulting from the shattering of glass in automobile accidents vary up to 45 per cent of all injuries from motor vehicle accidents. What proportion of these injuries were eye injuries it is difficult to ascertain. We believe it is safe to assume, however, that a very large proportion of these injuries involved eye injuries because all windows of automobiles are naturally on a level with the eye, and shattered glass

would in most instances fly against the face of drivers and passengers.

Within the past month, three states—New York, Nebraska, and Pennsylvania—have enacted legislation which provides for the installation of non-shatterable glass in all motor vehicles in the near future. There is no question but that the furtherance of this action throughout all the states would result in a reduction of death and serious injury from automobile collisions, and that it would also bring about a marked reduction in eye accidents.

Illinois Triumphs

We congratulate Illinois, and particularly the Illinois Society for the Prevention of Blindness, on their new law to reduce ophthalmia neonatorum by making obligatory the use of a prophylactic in the eyes of the newborn. Less than two years ago, progressive citizens of Illinois suffered a disheartening blow when such a bill was vetoed. But, undaunted, everyone continued to work toward resubmitting it; and on April 20 Governor Horner signed the bill linking his state to the more progressive states—30 of them—in fighting blindness from this source.

All told, 45 states of the Union have laws to aid prevention of infant blindness. In 14 states, however, the laws are not complete. Three states have no law compelling prophylaxis to save their citizens from such needless tragedy. Here is work to be done, and good citizens may find a reward for their labors, even as happened in Illinois.

The Forum

THIS section is reserved for informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request.

Cross-Eyed Children—What to Do for Them and When

What the real underlying cause of a "squint" is we do not know. Does the eye squint because of poor vision or does the poor vision follow the squint? Which was first, the chicken or the egg? There is no doubt at all that the eye which squints gradually and surely loses its good vision. A squinting eye is not taking an active part in seeing, especially at the near point—that is, reading and writing.

At the present time the ophthalmologist cannot offer any satisfactory explanation for this most serious ocular defect. There may be a certain number of eyes that have defective vision at the time of birth and in these cases the squint will develop very early. Such a case may show a well-marked convergent squint, commonly called "cross-eye," before the tenth month. Every oculist has seen these cases, and in some of these children the squint may be noticed only on occasions and during the rest of the time both eyes may be perfectly straight.

There is another group of children in which the squint does not appear until the third, fifth, seventh or tenth year, and when these cases come to us for examination and refraction the vision in the squinting eye is usually 20/200 and is unimproved with any glass.

It is possible that the vision in these eyes was never normal but

the squint uncorrected with glasses for some years may have caused the gradual reduction of the vision.

This is written to make a direct appeal to the family physician, the nurse or the welfare worker because they are often the first ones that the mother turns to for advice.

The oculist too often hears from the mother that she has been told to wait until the child is eight or ten years of age before getting glasses. What she should be told is, take your child to your oculist today and have the child's eyes tested and fitted for glasses.

The glasses must be worn constantly, and in nearly every case the squint will disappear and the strain will be taken off the other eye. In a certain number of cases the vision in the squinting eye will improve.

Various forms of eye exercises have been devised for the squinting eye, having in mind the improvement of the vision and the development of the fusion center, that is, the brain center which causes the two eyes to move together and focus on the same object.

In the great majority of these cases no operative procedure is necessary. The point to be especially emphasized is the securing of the proper glasses the minute the squint appears, no matter how young the child may be. I have prescribed glasses any number of times for children under twelve months of age and they are worn just as readily by the child as any article of clothing.

In the public schools in the City of New York there are 50,000 cases of convergent strabismus, or cross-eye. How many are there in Nassau County? We know there is a great number of cross-eyed children in our schools who do not have the proper glasses.

WALTER BAER WEIDLER, M.D.—Reprinted, with permission, from the *Nassau Medical News*, February, 1933.

Carrying on School After an Earthquake

The date—March 10, 1933. The time—5:55 P. M. A rumble, a swaying, then suddenly—jerkings, twistings, crashings, rocking, quivers—and calm. All in eleven terrifying and stunning seconds! Eleven seconds! But the effects will be felt, no doubt, by the schools for eleven years.

Our apartment house, being earthquake proof, withstood the shock. Only a few chimneys were down and some windows broken in our block. One is apt to judge a disaster by the harm done to one personally and to one's own little neighborhood. Therefore we did not realize the full force of the quake nor the significance to us and the influence on our futures, until we began hearing rumors. We decided to see for ourselves what really had happened.

Prepared, as we thought we were, by reports of the damage, it was still a terrible shock to find those beautiful school buildings we had left only a few hours before, in their present condition. Even yet we cannot fully realize that March 10 was our last day of school in them. The building in which I taught is still standing, but no children are permitted to enter it. Condemned schools are enclosed by fences, and closed until provision is made to demolish or reinforce them.

After two weeks of vacation, declared by the Board of Education, and our usual Easter vacation, we had recovered enough to begin school. As the buildings could not be used, classes were held under tents, beach umbrellas, canvas covers, or trees, for shade. Each teacher gathered her children in small groups, some in the morning, the rest in the afternoon. Each group remained for one hour. The local paper published home lessons and advice to parents for home study. Radio programs for junior high school pupils were broadcast, using the different subjects for lessons. Children brought their home work to be checked and received the necessary help from the teacher. Assignments for the next day's lessons, to be studied during the home hours, were then made.

Men and materials soon arrived on the grounds and the bungalows began taking shape with magical speed. We took our groups into the bungalows for hour sessions until everything was in readiness for full sessions.

Three weeks of vacation, two more in the open, and teachers and pupils alike had acquired a healthy tan. All were enthusiastic and eager for school to begin in the new quarters.

Two teachers were assigned to each bungalow. One teacher from 8 to 12:10, and the other from 12:20 to 4:30. There are still some home work and radio lessons to supplement this program.

Our class shares the bungalow with the kindergarten. This gives us plenty of room to move our "roving chairs"—as some one humorously calls them. We have the afternoon session.

When the sight-saving class children are enrolled in the morning session grades, they come then for their oral work, which the regular teachers have considerately placed at the end of their program. They go home for lunch and come back at one o'clock for the special work. Thus their hours are conveniently arranged so they will attend the same length of time as the regular grade pupils. With the approval of the parents, they may stay for extra work in typing if they wish—and they all do.

The junior high classes come in the afternoon for their regular as well as special work. There are ten in junior high school class and one 4B braille reader in that group. We have fifteen enrolled in our elementary section, in eight divisions. Our groups are in different schools.

To the "sight saver," the lighting conditions are not ideal. But many classes must be held in tents and under much more unfavorable conditions; so we are grateful for what is allotted to us and are carrying on under much more favorable circumstances, and with conditions more normal, than we thought possible on March 11.

School will continue till July 1. This gives us the usual number of days' attendance required in this state for promotion and state aid.

So we will close our eventful year with a feeling of "well done"; since what we lost in hours of attendance in the school room has been more than balanced by what we all gained in courage, consideration, helpfulness and good sportsmanship.

Jessie I. Campbell, Sight-Saving Class
Teacher, Long Beach, Calif.

The American Board for Ophthalmic Examinations

Just what the American Board for Ophthalmic Examinations is and what it does are tersely described by Dr. Walter R. Parker in a recent issue of *Archives of Ophthalmology*, in which he discusses the general subject of "The Teaching of Ophthalmology in This Country." For the benefit of those of us who would like to know some of the outstanding details, we are quoting Dr. Parker.

"I should be remiss if I did not refer to the activities of the American Board for Ophthalmic Examinations. The object of the Board is to examine candidates and to certify as to their fitness to practice ophthalmology, and to act in an advisory capacity when requested. There are nine members on the Board, three from each of the national societies, the American Ophthalmological Society, the Section on Ophthalmology of the American Medical Association, and the Academy of Ophthalmology and Oto-Laryngology. Each society elects one member annually to serve for a term of three years . . .

"The importance of the certificate to the holder has been greatly enhanced by the fact that not only the national societies have made the certificate part of their requirements for membership, but several hospitals require it for positions on the staff. The efforts of the Board have only an indirect effect on the teaching of ophthalmology. The members of the committee recommend that two years be the minimum for training. Of the two years, the first should be devoted to systematic work divided between fundamental and clinical subjects; the second should be spent as an interne in a hospital, as assistant in a well-organized eye clinic, or as a private assistant in the service of a competent ophthalmologist. A list of the subjects to be included in the fundamental and clinical courses is recommended by the Board, but no course of instruction is attempted. In addition to the two years recommended for training, a third year in the practice of ophthalmology, or as an assistant, is required before the candidate shall be eligible for examination by the Board. Each candidate is required to submit case records and to show an intimate knowledge of the following subjects: (1) external diseases of the eye; (2) ophthalmoscopy; (3) pathology and anatomy; (4) errors of refraction; (5) ocular muscles; (6) perimetry; (7) relation of eye conditions to general disease; (8) therapeutics and operations."

Note and Comment

Silver Anniversary of the National Society for the Prevention of Blindness.—Marking its twenty-fifth year of effort to save sight, the National Society opened its offices to members and friends at a tea on May 24. The occasion was particularly happy in that it presented an opportunity for the meeting of old and new friends. Greetings were received from many people in allied fields who have contributed to the progress of prevention of blindness. Members of the Board of Directors and their wives, assisted by the staff, welcomed the guests. Many congratulatory messages were received, from which we quote:

Mr. Stephen Early, Secretary to President Roosevelt:

> "Despite the almost crushing pressure under which the President is working these days in connection with the national and international problems which require his attention day and night, he has asked me to extend his congratulations to the National Society for the Prevention of Blindness on the splendid work already accomplished and his best wishes for extension of these benefits in the future to those now in need."

Prof. F. de Lapersonne, President, International Association for Prevention of Blindness:

> "Heartiest congratulations to the American National Society and warmest wishes for a larger development of its noble philanthropic work."

Miss Helen Keller:

> "I greet you and your co-workers on the twenty-fifth anniversary of the National Society for the Prevention of Blindness. It is one of the pleasant satisfactions of my life to look back over the history of the Society, and to feel that I have had a small part in its beneficent activities.
>
> "For a quarter of a century the organization has stood a noble citadel against ignorance which plunges human beings into endless night. The good it has wrought is so positive, so undeniable, so beautiful in helpfulness that merely to speak of it on this occasion sets our hearts beating faster, and our

minds glowing with forward-looking hope for a day when there shall be no preventable blindness in the world! Wholeheartedly I join you in a vigorous and victorious campaign to preserve God's gift of light in human eyes."

Mrs. Franklin D. Roosevelt:

"Sorry I cannot be present Wednesday, May 24, to commemorate the twenty-fifth anniversary of the founding of your organization. Think you are doing splendid work and send very best wishes for continued success. Many regrets that I cannot be with you."

Miss Lillian D. Wald:

"I recall with pride and great satisfaction the privilege of having been associated with the valiant group who saw the opportunity and the privilege of organizing this Society. I am sure all who are interested would desire that future children will be protected from this great handicap to a complete life, and that the Society will be able to retire eventually with all the objectives realized."

Dr. William F. Snow, President, National Health Council:

"You will receive letters on this twenty-fifth anniversary from each of the member agencies of the National Health Council. But, as president, I want to add a special note of felicitation and appreciation of the Society's statesmanship and understanding teamwork in promoting conservation of vision as a part of rather than separate from health conservation as a whole. Never has the Society forgotten the mind and body behind the eye. This is significant in the history of special interest agencies."

Miss Marguerite A. Wales, General Director of Nurses, Henry Street Visiting Nurse Service of New York:

"The Visiting Nurse Service of New York City is pleased to send its warmest congratulations to another organization in the field of public health, the National Society for the Prevention of Blindness, which may be justly proud of its accomplishment in saving sight since its small beginning twenty-five years ago. All of us who know of the Society's development from a campaign against blindness among infants in New York State to a nation-wide attack on all preventable causes of blindness, have the highest admiration for its work."

Mr. William H. Cameron, Managing Director, National Safety Council:

> "The National Society for the Prevention of Blindness has a record of achievement which deserves recognition by every individual and institution interested in human welfare. The National Safety Council has long been happy to co-operate in your constructive national effort to preserve that precious asset of eyesight which is so vital to the normal functioning of life. This co-operation has been particularly active in American industry and measurable results have been obtained that should furnish inspiration for a continued and expanded program."

Mr. Robert I. Bramhall, Director, Department of Education, Division of the Blind, Massachusetts:

> "Massachusetts sends its congratulations to the National Society upon the completion of twenty-five years of pioneer service in the prevention of blindness and conservation of vision. As a result of your activities untold numbers have been saved from needless blindness while many others have been able to save their remaining sight."

The Fourteenth Concilium Ophthalmologicum.—For the first time in the history of ophthalmological congresses, preventive measures occupied a prominent place on the program of the Fourteenth Ophthalmological Congress held at Madrid, Spain, April 17 and 18, 1933.

The morning of the first day was turned over to the International Association for Prevention of Blindness. In the absence of Prof. de Lapersonne, whose health prevented him from attending the Congress, the session was presided over by the vice-president, Dr. Park Lewis. The annual address by Prof. de Lapersonne was a report on the progress of the international work during the past year, read by Dr. Coutela.

An important paper was presented by the president of the Congress, Prof. Marquez, of Spain, on the "Necessity of a Rational Classification of the Causes of Blindness." An interesting discussion followed and a committee was appointed to consider the standardization of blindness from a professional viewpoint and present a formalized report at the next Congress. The committee

chosen were Doctors de Lapersonne, Park Lewis, Bishop Harman, Maziny Bey, Marx and Marquez.

Reports were presented as to the formation of national societies for the prevention of blindness from France, United States, Belgium, Austria, Egypt, Holland, Brazil, Bulgaria, Spain, Hungary, Poland, Portugal, Switzerland, and Germany, in all of which preventive movements had made great progress.

Additional Material on Trachoma.—Those who followed the intensive research work on trachoma of the late Noguchi will be interested to hear of the publications by Dr. Peter K. Olitsky, Dr. Jerome T. Syverton and Joseph R. Tyler on extension of this work, which is being carried on at the Rockefeller Institute for Medical Research. The *Journals of Experimental Medicine* for February and May contain discussions of these investigations under the title, "Studies on the Etiology of Spontaneous Conjunctival Folliculosis of Monkeys," Part I. Transmission and Filtration Experiments, and Part II. Bacteriological Experiments. Previous to that, *Science* for January 6 contained an article on "Induction of Experimental Granular Conjunctivitis by Direct Inoculation of Trachomatous Tissue." All of this material has been reprinted and makes a valuable addition to the literature on the etiology of trachoma.

Illinois Passes Ophthalmia Neonatorum Bill.—When, two years ago, the bill requiring that all newborn babies have prophylactic treatment for the prevention of babies' sore eyes was vetoed by the governor, work for its passage was renewed by the Illinois Society for the Prevention of Blindness and the other organizations interested in reducing blindness in the state. On April 20 of this year the bill was signed by Governor Horner, who refuted its alleged unconstitutionality on the grounds that prophylaxis is an act of sanitation, not of compulsory medication. Congratulations are being extended to those who worked so tirelessly to bring about its passage.

National Eye Service in England.—Patients of limited means now have opportunity to obtain expert eye service under the direction of the National Ophthalmic Treatment Board in England.

Formerly, the only services available to this economic group were out-patient departments in hospitals or sight-testing opticians, the English equivalent of optometrists. That this new type of service is of definite benefit to the patients is seen in statistics of 120 persons using this service: two had previously been seen as private patients but would have been financially unable to return except under the new service; one might have been able to pay a $5 fee; the other 117 would have gone to hospitals or to sight-testing opticians. Six of the patients were subsequently admitted to hospitals, and 80 needed treatment in addition to prescription of glasses. Had they gone to opticians, they would not have had the medical care necessary to prevent further loss of vision.

Dr. Wilder Honored.—The Eye, Ear, Nose and Throat Section of the Illinois State Medical Society held its annual meeting in honor of Dr. William H. Wilder, dean of Illinois ophthalmologists. Personal tributes were paid to his influence as a teacher, a physician, and as moving force in the founding of the American Board for Ophthalmic Examinations; and a gift was presented to him as a reminder of the meeting in his honor.

Who Is Our Brother's Keeper?—"A superintendent of one of the local hospitals 'phoned our organization that a five-day-old baby suffering from a positive eye infection had been sent home with its mother, and unless funds could be secured to employ a trained nurse, day and night, for three days, the child faced a life of blindness. Seven organizations were contacted in trying to get the proper authorities to assume this responsibility. When we realized it was impossible to secure assistance, the Toledo Society for the Blind agreed to pay the hospital for three days' nursing care in order to save the eyes. Although our check from the Community Chest has been only $37.50 the past two months, we place the value of eyesight far more than $36, the cost of the two nurses for three days."—Excerpt from the monthly report of the Toledo Society for the Blind, Toledo, Ohio.

The fine and generous response of the Toledo Society for the Blind in aiding a helpless child and preventing its ultimate blindness is to be heartily commended. Yet, in the midst of approval and admiration, we cannot but wonder at the seven organizations,

as well as the hospital in which the child first saw light, which were so wound up in official red tape that, for lack of a few dollars, they would have shared in destroying the sight of a little child. We raise the question: To whom does the ultimate responsibility belong?

Eyes—Their Insurance Value.—The loss of two eyes is not just twice the loss of one eye, protests Dr. George Lindsay Johnson, in the April *Archives of Ophthalmology*. Although that is how the compensation is figured by insurance companies in Great Britain and some of her colonies, a better understanding of the difference between the loss of one eye and the loss of both would bring about more intelligent handling of compensation. The loss of one eye must be considered in relation to the occupation; the loss of both might well be compensated by an annuity of half the wage for life. Ophthalmologists realize these facts; the law should recognize them.

Visual Performance Varies Under Different Daylight Illumination Values.—Using three different tests, K. Y. Tang reports, in the April issue of the *Transactions of the Illuminating Engineering Society*, that visual performance is greatly increased with increased daylight illumination. While many occupations require only a short visual span, with long intervals of manual and body activity, the speeding up of visual tasks through improved lighting has definite effects in industry; furthermore, the recognized psychological influence of increased daylight has a tonic effect upon production.

Color Blindness a Definite Handicap.—Although the difficulties which face the color blind in the ordinary course of life are negligible, among a group of seventy junior medical students the nine who were to some degree color blind met real difficulties. Faced with simple diagnostic problems, which depended upon an accurate color sense for solution, they failed to identify the organisms. Obviously, color blindness is an unsurmountable handicap in diagnostic and laboratory work, although these students, having a good discrimination for brightness, would do well in the field of roentgenology, conclude Dr. Leandro M. Tocantins and Dr.

Harold W. Jones, in a recent article in the *American Journal of the Medical Sciences.*

Prevention of Blindness in Iowa.—From the records of blindness compiled by the Iowa Commission for the Blind, cataracts have been found to be the greatest cause of blindness in that state. Glaucoma, trachoma and optic atrophy follow in importance. The legislature has voted to increase the number of venereal disease clinics in the state, a step, it is felt, which will materially reduce the amount of blindness from optic atrophy. Although Iowa has a law demanding that a prophylactic (silver nitrate) be used in the eyes of all newborn infants, seven children lost their sight this year from ophthalmia neonatorum. It is reasoned that if the silver nitrate ampules which the state distributes free of charge were used uniformly, there would be no danger of midwives or attendants at birth using the wrong prophylactic, or one that had lost its effectiveness. Protection of the eyes of school children is an important part of the efforts of the department for prevention of blindness, according to the 1932 annual report of the Iowa Commission for the Blind, and preschool vision testing has been demonstrated in many centers of the state.

Sight-Saving Classes Considered in South Africa.—The problem of the partially sighted child has been taken under consideration by the South African National Council for the Blind, according to a note in *Child Welfare—Kindersorg.* Quoting Dr. L. van Schalkwyk, organizing inspector of Union Education, it says: "The South African National Council for the Blind has focused public attention on the problem, and those authorities which have been approached have expressed appreciation of the problem and a desire to make some provision, in the nature of an experiment, to meet the existing needs for a sight-saving class."

Hand Slit-Lamp.—The slit-lamp has proved beyond doubt its usefulness in obtaining a deep view of the eyegrounds; for the examination of children and patients confined to bed, the hand slit-lamp will prove a valuable supplement to the larger apparatus. Dr. N. Bishop Harman describes the hand lamp in the March 25 issue of the *Lancet.*

Conservation of Vision—An Interlocking Public Function.—The prevention of blindness and the conservation of sight are a public service which is undertaken by varied departments. The Missouri Commission for the Blind, in its biennial report covering the years 1931 and 1932, traces its activities in the prevention of blindness through the avenues of public education: diagnostic clinics were held in co-operation with local agencies; vision testing demonstrations were given before teachers and nurses; special educational facilities were recommended for partially sighted children in districts having no sight-saving class; the Commission's films on prevention of blindness, its material and publications, were widely shown to teaching, professional, and lay groups throughout the state.

The two-year report of the Board of Education of the Blind of Connecticut shows a different approach to the problems of conservation of vision. In its rôle as educator of the blind, the Board has available statistics on causes of blindness in the state, upon which it may base its educational project for the prevention of blindness. Trachoma and syphilis are two important preventable causes of blindness on which efforts may be expanded. As conservor of sight, the Board assisted the city of Bridgeport in a survey of children with visual handicaps, finding those for whom a sight-saving education would be advantageous.

The annual report of the Board of Health of the city of Chicago shows a more direct dealing with the conservation of sight. To it come the first reports of cases of ophthalmia neonatorum; school and preschool vision testing are done under its supervision, and the reporting of correction of defects and the decision for entry into sight-saving classes lie in its hands. Other general health activities serve as indirect agents in conserving the city's sight.

New Instrument to Aid Prophylaxis Technique.—To overcome the difficulty sometimes encountered in trying to separate the eyelids of the newborn baby, Dr. Mario A. Castallo has designed an instrument which will gently but firmly separate the eyelids for the instillation of prophylactic drops. This instrument is described and illustrated in the March issue of the *American Journal of Obstetrics and Gynecology.*

Compensation Costs Diminish Under Eye Care.—After the California Wire Cloth Company had made and acted upon an illumination survey of its plant and a visual estimate of its employees, it found that the cost of compensation had fallen from $7 per man per year to $1.96. The results of the eye examination brought to light certain interesting facts: although over 96 per cent of the men had vision better than 20/40, 78.75 per cent showed susceptibility to accommodative fatigue; it was found that 53.75 per cent of the men showed a reduced field of color perception below 20 degrees, representing a serious accident hazard. Corrective lenses were prescribed to lessen the working fatigue, and further safety measures were taken in transferring men with visual defects to positions compatible with their visual ability. For full benefit, S. C. Pohlman, vice-president of the company, recommends adequate employee records and periodic follow-up of eye examinations.

Lighting Engineers Study Wall Paints as Aid to Lighting.—Although it has long been agreed by lighting engineers and others interested in lighting problems that the reflectivity of walls and ceilings may definitely affect the amount of illumination in a room, a recent study by D. L. Gamble, reported in the April *Transactions of the Illuminating Engineering Society*, investigates the subject experimentally. Using in sample rooms various kinds of wall paints in current use—magnesium oxide, white wall paint, mill white gloss, yellow, green, gray and pink tinted paints, and metallic paint and black diffusing paper—in combinations with direct, indirect and natural illumination, it was found that the illumination in foot-candles from the reflected surfaces was greater for the magnesium oxide than for other wall finishes; that while the light-reflecting value of flat white wall paint is greater than that of mill white gloss, the diffusing quality of the latter is so much greater that little loss is found. In general, both direct artificial and natural lighting are to a very appreciable degree dependent upon the reflection characteristics of the walls.

A Rural Public Health Experiment in China.—The urgent need for medical relief in rural centers in China has led to efforts to correct this lack. The report of the "Ting Hsien Experiment," given in the April *Quarterly Bulletin* of the Milbank Memorial Fund,

demonstrates the possibilities of organized scientific medicine applied to a rural community. Lack of knowledge of hygienic rules, slow and laborious means of travel and communication, and sparsity of trained medical workers and centers have caused widespread disease. Particularly interesting is the information on the extent of eye disease and the steps now being taken to prevent the accompanying visual impairment. Ting Hsien covers an area of about 44 square miles; the total population of its 61 villages is 44,190; the average annual income per capita is between $6 and $7. Fifty-six per cent of the children in the primary schools were infected with trachoma. After the organization of trained health workers in the villages and the allocation of physicians to the 31 villages without medical aid, 51.3 per cent corrections were made for the children with trachoma and 50.8 per cent of the cases were practically cured. Further education in prevention of eye disease was given in the health lectures at the People's Schools, which were attended by adults. The report shows that only organized community efforts will produce an efficient and far-reaching machinery for solving fundamental problems in health as well as in other phases of life.

Dominant Side of Reading.—Another firm belief began to topple when a study at Columbia University showed that, of 4,400 readers of newspapers in subways and waiting rooms, three-quarters of the number look first to the left in opening their newspapers and only a quarter looked first to the right. This observation shatters the superiority of right column news, so placed because, as the most important news, it should come to the reader's attention first; advertisers who are paying slightly higher rates for right-hand pages will encourage a fuller study to verify this finding.

Trachoma Costs in Missouri.—Since Missouri, with the assistance of the United States Public Health Service, has started the work against trachoma, some 6,100 cases have been found. Fortunately, only one in seven of these patients has suffered an incapacitating loss of sight (20/200 or less), and only 750 are on the blind pension roll. One-third of the cases have been hospitalized, with an average hospital stay of 29 days. Since in 80 per cent of the hospitalized cases the disease is arrested, at a cost to the state of

$60.32 per patient, while blindness costs the state $300 a year for each patient, the value of this early preventive and curative work is apparent.

Summary Round-Up Activities Renewed.—The beginning of the summer vacation marks also the beginning of the new summer round-up for health examinations of preschool children, which is sponsored by the National Congress of Parents and Teachers. Coincident with the opening of this year's campaign to send "the whole child to school," come last year's tabulated reports of the health survey of children entering school for the first time. Of the entire number of children eligible for this preschool examination in communities giving examinations, more than half attended the round-up examination; of these, five per cent were found to have defects of vision. The number of corrections for vision defects equalled the number of corrections for other defects: one-third of defects have received attention and have been corrected since their discovery. The extension of the program of preschool examinations to discover and promote correction of remediable defects should bring about a healthier and happier school population.

The Dictaphone as an Aid for Sight-Saving Classes.—The typewriter has assumed its permanent place as an educational tool for children in sight-saving classes; the introduction of the dictaphone promises to become as great an aid. The particular value of the dictaphone is in the recording of reading matter which it has hitherto been necessary to read several times to different sections of classes and which now, once recorded, may be used as a permanent text-record for students in different sections or in different study periods. George F. Meyer writes of its use in detail, for braille and sight-saving classes, in the March issue of the *Teachers Forum.*

Causes of Blindness Tabulated for Japan.—For the first time a nation-wide, simultaneous survey of the causes and incidence of blindness has been made in Japan. Of particular interest to those concerned with the prevention of blindness is the fact that the tabulation of causes does not identify the immediate eye disease, but lists the etiological disease leading to the eye condition. Gonorrhea,

trachoma, syphilis and malnutrition were the leading factors in the causation of eye involvement. Figures show that 11.67 per 10,000 of the population are blind; 25 per cent of the blind lost sight during the first five years of life, demonstrating the preponderance of blindness from venereal diseases and congenital causes, much of which is preventable. A detailed report of this survey may be found in the March issue of the *Journal of the Public Health Association of Japan.* A vast undertaking in education and in service awaits the Central Society for the Welfare of the Blind, of Japan, which is at present initiating a program for conservation of vision and prevention of blindness.

Research in Format of Children's Books.—Although recent years have focused attention upon the contents of books for children, little study has been made of the physical aspects of the books. Problems of format—typography, paper, spacing and illustration—have been decided upon arbitrarily, with the result that some books for children are printed in 24-point type, while others, for the same group of children, are printed in type as small as 10 point. A year ago, in Baltimore, three organizations—the Maryland Society for the Prevention of Blindness, the Public Schools of Baltimore, and the Enoch Pratt Free Library—pooled their interest in the physical aspects of books for children, and called into consultation publishers, librarians and ophthalmologists for a co-operative effort to determine what type and arrangement of printing is best suited to the eyes of children. The study has now come to the point where representatives of national organizations are being asked to assemble at a June meeting to share in this important enterprise.

Motor Health Units in Pennsylvania Check Up on Eyes.—The two traveling health units, operated by the preschool section of the Bureau of Child Health in Pennsylvania, have examined ten thousand children between the ages of two and six in the past season. The cursory examinations of the eyes of children just about to enter school led those in charge of the examinations to the conclusion that all children over four years of age should have a visual examination. The finding of a preschool child with one blind eye (which might go unnoticed through his first year at school), which

offers the possibility of saving the other and thus conserving sufficient useful vision, makes the effort in examining every child well worth while.

Physical Defects Retard School Progress.—What is the correlation between physical defect and school achievement? This is the question which the director of health and physical education of Fresno, California, schools sought to answer in making an analysis of the health and school records of 811 children in the first to sixth grades. It was found, for instance, that few children in the group who were advanced for their age had vision defects; in the group who were of normal age for their grade an equally small percentage had uncorrected visual defects; among those pupils who were retarded in their school progress, however, the percentage of defects was double that of the two other groups. Also of interest is the fact that while parents of all children with defects were notified, the parents of children in advanced and normal groups responded three times as frequently as did those of children in retarded groups. Vision defects apparently prevent the child from attending thoroughly to instruction. Such statistics should persuade parents of the importance of early examination for children and of prompt correction of defects before the school age.

Lighting Convention.—The annual Illuminating Engineering Society convention will be held this year at Lake Delavan, Wisconsin, August 28 to September 1. Facilities for a full day's visit to the Chicago Century of Progress, on Illumination Day, as well as an interesting convention program, will be offered.

New Head of Eye Social Service Committee in New York.—Miss Ruth B. McCoy, R.N., director of prevention of blindness activities of the New York State Commission for the Blind, has been named chairman of the Committee on Development of Social Service in Eye Clinics of the Medical Social Service Section of the Welfare Council of New York City. Miss Sophie M. Cunningham, director of social service in eye clinics of the New York Eye and Ear Infirmary, will serve as vice-chairman; any matters relating to the Committee may be taken up with Miss McCoy or Miss Cunningham.

Flying Glass Hazard to Be Eliminated.—Although there have been no accurate statistics on the amount of blindness or visual impairment caused by flying glass in automobile accidents, the large figures of permanent injuries and deaths caused by this hazard have led to legislative action in two states, within the past month, for the elimination of shatterable glass in automobiles. In New York State the act calling for the installation of shatter-proof glass in all public motor vehicles by 1934, and in all motor vehicles by 1935, passed the legislature and was signed by the governor on May 5. A similar bill was enacted in Nebraska on May 12; and recent information tells of like action in Pennsylvania.

Sharp Decrease in Eye Accidents Follows Improvement in Goggles.—In plants where care is exercised in the prevention of eye accidents, results are concrete, and, in the case of the General Electric Company, dramatic, in the extent of the decrease of eye accidents. Following the National Safety Council's definition of eye accident as an incident of such severity as to require loss of time, the annual report of the General Electric Company shows that in 1918 eye accidents occurred at the rate of 24.62 per 1,000 employees; in 1932, 0.78 eye accidents per 1,000 were recorded. Among the reasons which explain this remarkable fall in accident rate is the fact that protective goggles, once so awkward and cumbersome that it was nearly impossible to enforce the mandatory rule for their wearing, are now made with stronger lenses and are comfortably fitted, insuring fullest employee co-operation in this protective program.

New Head of Missouri Commission for the Blind.—Mrs. Mary E. Ryder, who has been actively engaged in welfare work in Missouri, has been appointed executive director of the Missouri Commission for the Blind.

National Society Notes.—The National Society for the Prevention of Blindness is happy to announce the association of Dr. Colman W. Cutler, long a member of its Board of Directors, with its staff as special consultant and medical adviser. Dr. Cutler is serving on a voluntary basis, generously giving of his vast fund of

knowledge and experience as an ophthalmologist, to advise on the medical aspects of prevention of blindness.

Dr. Park Lewis, vice-president of the Society, has returned from Madrid, where he represented the National Society at the International Congress of Ophthalmology.

At the institute for conservation of vision, given under the auspices of the prevention of blindness department of the New York State Commission for the Blind, in Buffalo, April 28 and 29, the National Society was represented by Mr. Lewis H. Carris, managing director, Mrs. Winifred Hathaway, associate director, and Miss Eleanor P. Brown, secretary.

Mr. Carris was present and active at the public hearing in Albany, on May 4, of the bill which aimed to introduce in New York State the mandatory use of non-shatterable glass in all motor vehicles. The measure has been passed and approved by the governor.

Sight-saving classes in the Middle West were the concern of Mrs. Hathaway on a recent trip to Illinois, Minnesota, Wisconsin and Michigan. At the meeting of the Section on Ophthalmology of the College of Physicians in Philadelphia, on March 16, Mrs. Hathaway spoke on "A Layman's Impression of the Maddox Clinic." She also addressed the course in Educational Hygiene at Columbia University on May 6.

Miss Mary Emma Smith, R.N., director of nursing activities, is on an extended trip through the West; her itinerary includes the states of Iowa, South Dakota, Wyoming, Utah, Nevada and California, where she has been giving demonstrations of the technique of vision testing for young children, as well as conferences on sight conservation for school programs.

Miss C. Edith Kerby, statistician for the Society, has made several trips to the Pennsylvania Institution for the Instruction of the Blind, at Overbrook, in connection with a study of causes of blindness.

Co-operating with the Medical Information Bureau of the Academy of Medicine and the New York Tuberculosis and Health Association, the National Society broadcast its message of sight conservation over stations WEVD, WINS, and WNYC. Mr. David Resnick, publicity director, Miss Eleanor P. Brown and

Mrs. Winifred Hathaway talked, respectively, on "Saving Children's Eyes," "Eyes We Remember," and "Eyes of the Handicapped Child."

The National Society is pleased to announce the addition to its Advisory Committee of Dr. Lawrence T. Post, acting head of the Department of Ophthalmology, Washington University; and Dr. Forrest J. Pinkerton, ophthalmologist in Honolulu, and trustee of the Palama Settlement, Territory of Hawaii.

Current Articles of Interest

Illumination in Industry, W. J. Jones, *Journal of the Royal Sanitary Institute*, November, 1932, published monthly by the Royal Sanitary Institute, London, England. The relationship between lighting and the well-being of the worker and his over-all efficiency should convince employers of the practical value of providing adequate and well-diffused illumination in industry. Existing lighting practices in surveyed plants showed faults of glare, shadow and insufficient light. Recommendations based upon modern concepts of eye health are made.

Hereditary Ophthalmologic Defects, R. H. Needham, M.D., and A. E. Jackson, M.D., *Texas State Journal of Medicine*, March, 1933, published monthly by the State Medical Association of Texas, Fort Worth, Texas. Defining the term heredity, and demonstrating the course of inheritable traits, the authors urge ophthalmologists to study and recognize those eye defects which are hereditary, in the interest of the patient and of the future generations. They conclude that eye conditions are transmitted through the chromosomes by means of more or less definite laws, rather than by accident, and that the eye is probably the most common organ in the body to be influenced by hereditary factors.

Certain Motor Anomalies of the Eye in Relation to Prescribing Lenses, Conrad Berens, M.D., Paul T. Connolly, M.D., and Dorothy Kern, *American Journal of Ophthalmology*, March, 1933, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. Glasses that accurately correct refractive errors do not always give their wearers complete comfort; a routine examination for detecting motor anomalies, through measurement of fatigue of convergence and accommodation, is recommended. Treatment for various types of muscle imbalance is outlined.

Lighting Without Glare, C. E. Ferree and G. Rand, *Archives of Ophthalmology*, March, 1933, published monthly by the American Medical Association, Chicago, Ill. With the great increase in in-

tensity of illumination, it seemed advisable to approach the problem of glare elimination from a different angle from the established custom. The authors have designed a lighting fixture which uses baffles as a means of doing away with glare. The fixture, which is described and illustrated, not only diffuses the light on the working surface, but prevents intense illumination of the ceiling—a fault of indirect lighting—and it preserves the whiteness of the light, without any appreciable loss of illumination.

Workrooms Without Windows, D. W. Atwater, *National Safety News*, April, 1933, published monthly by the National Safety Council, Inc., Chicago, Ill. Since daylight illumination has been shown to be a variable commodity, completely artificial illumination in a windowless office may be called upon to supply constantly satisfactory illumination. Artificial air conditioning takes the place of natural ventilation in this windowless office; sunlight lamps are able to supply consistently the health-giving rays of natural sun; and illumination is controlled by switches and is not dependent upon the weather or the time of year. Advocates of the windowless structure claim that omission of windows reduces construction costs about five per cent and maintenance costs about 40 per cent.

Vision in Industry, John Pike, *Journal of the Royal Sanitary Institute*, November, 1932, published monthly by the Royal Sanitary Institute, London, England. Employers can assist in the movement for the prevention of blindness and visual impairment by minimizing risks of eye accidents and eye disease, by improving protective devices, and by promoting the idea of eye health. A study of the visual requirements for special occupations is recommended, to prevent accidents and to promote the general well-being and productivity of workers.

School Clinics, Edward Jackson, M.D., *American Journal of Ophthalmology*, April, 1933, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. Clinics are needed to give the eyes of school children the best supervision and help. Because parents are slow to recognize eye defects, the school should have some definite means of identifying those children who need visual

attention. While it is impossible for all children to have a thorough eye examination before entering school, those children who present health or behavior problems, or who exhibit signs of eyestrain, should have a full ophthalmological examination in the school eye clinic. Such eye service, like the orthopedic and the tuberculosis services, should form part of the general health program for school children.

Goggles, W. F. Weber, *Safety Engineering*, April, 1933, published monthly by the Safety Magazine Publishing Corporation, New York, N. Y. The variety of occupations requiring goggles demands a study of the type best suited to each position. Goggles are used as a protection against impact, against dust, against splash, and against glare and luminous rays. Descriptions are given of the type of goggles for each use; emphasis is put upon the considerations of comfort, convenience and easy visibility, as factors helping to insure their continuous wear.

The Special Features of Ophthalmic Practice in Tropical Countries, R. H. Elliot, M.D., *Folia Ophthalmologica Orientalia*, November, 1932, published quarterly by the Folia Medica Orientalia, Jerusalem, Palestine. Tropical ophthalmology represents a special field, since many of its eye problems are unique. Climate, insects, the different standards of living must be appreciated and considered by the eye physician in the tropics; trachoma and cataract are great causes of blindness in these countries, and the ophthalmic surgeon will find a broad field for experience and service.

The Blindness of Milton, W. H. Wilmer, M.D., *Bulletin of the Johns Hopkins Hospital*, April, 1933, published monthly by the Johns Hopkins Press, Baltimore, Md. Following the outline of a modern medical history card, the writer briefly fills in the early history of Milton, his family background, the account of his marriages, etc., to lead up to a description of his eye difficulty, which began at the age of 33 and developed into total blindness at the age of 44. The symptoms—subjective and objective—and the treatment are described. Diagnoses are considered and the writer points out that the symptoms resemble those of glaucoma simplex.

Foci of Attack in the Prevention of Blindness in Missouri, Harvey D. Lamb, M.D., *Journal of the Missouri State Medical Association*, November, 1932, published monthly by the Missouri State Medical Association, St. Louis, Mo. Tracing what has been done in Missouri toward preventing blindness, the author shows that trachoma was in the past the greatest cause of blindness among adults in the state, while ophthalmia neonatorum was the major cause among infants. The very active campaigns waged against babies' sore eyes and trachoma have materially reduced blindness from these causes. Present figures show new fields of prevention that must be as thoroughly considered. In the 1932 figures of children in schools for the blind it is seen that optic atrophy has assumed the major rôle in blindness in the state, among children, and is the third greatest cause of blindness among adults. Hereditary loss of sight continues to play an important part in causing blindness, and the figure has not fallen. It has been estimated by authorities in a school for the blind that the cost to the state of caring for 27 pupils, coming from seven families, has been $52,700. The author quotes the axiom that an ounce of prevention in these tragic lives would be worth a pound of cure, and the small amount of money necessary to carry on a full prevention of blindness campaign is a very small part of that which might be needed to care for cases of preventable blindness.

Some Early Ocular Symptoms of Over-Indulgence in Sugar and Sweet Farinaceous Food, A. Maitland Ramsay, M.D., *British Medical Journal*, February 18, 1933, published weekly by the British Medical Association, London, England. The intimate relationship between the visual function and the blood stream is seen in cases of over-indulgence in sugar and cakes. Adults who complain of headache, persisting after full mechanical correction of refraction, are often found to be reacting to increased amounts of sugars in the diet. In children, phlyctenular conjunctivitis may be traced to lack of a properly balanced diet. "The general make-up of children who suffer from phlyctenular conjunctivitis is such," the author states, "that they offer feeble resistance to every form of infection, consequently they fall a ready prey to the ubiquitous tubercle bacillus . . . and it is very probable that in these

patients who are attacked disordered carbohydrate metabolism has paved the way for the onset of the tuberculous infection."

Siderosis Bulbi, M. Davidson, M.D., *American Journal of Ophthalmology,* April, 1933, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. Reviewing 15 cases of siderosis bulbi in his own experience, and the records of the literature on this disease, the author concludes that the large amount of siderosis (which, in 50 per cent of the cases, leads to industrial blindness) is caused by negligence after the accident—either through a too superficial ophthalmologic examination, or none at all. The length of time for the establishment of siderosis may be as short as eight days, or may run up to several years.

The Dependence of Eye-Hand Co-ordinations upon Eye Dominance, F. H. Lund, *American Journal of Psychology,* October, 1932, published quarterly by Cornell University, Ithaca, N. Y. The author finds, through tests of eye-hand relations, that there is no definite distinction between monocular and binocular dominant vision in eye-hand adjustments. In natively left-handed persons who had been trained to use the right hand, the natural left-eyeness had also shifted to equal ability with the right eye, demonstrating the convenience of using the eye nearest the hand in general use.

Eyes and Teeth, Charles A. Bahn, M.D., *New Orleans Medical and Surgical Journal,* May, 1933, published monthly by the Louisiana State Medical Society, New Orleans, La. Approximately fifty ocular conditions have been reported which are related to the teeth, through direct extension of the dental sepsis; by involvement of teeth and eyes from a common cause; by fatigue or reflex action in which the teeth are a dominant factor; or by focal infection of a dental origin. The writer concludes with the statement that glass eyes have no vision, while porcelain teeth are able to function as well as the original ones. The eye must be saved at the expense of the teeth, if this is necessary.

The Relationship of Bacterium Granulosis to Trachoma, Ida A. Bengtson, *Science,* February 24, 1933, published weekly by the Science Press, New York, N. Y. Report of a continuing study of

the relationship between *Bacterium granulosis* and trachoma. The question is raised: If it is definitely established that *Bacterium granulosis* is the etiological factor in trachoma, then the isolation of an organism which is non-filterable from a disease which is characterized by inclusion bodies is of significance.

Retinal Detachment—Its Operative Cure, Otto Barkan, M.D., H. Gordon Smith, M.D., and S. F. Boyle, M.D., *California and Western Medicine*, April, 1933, published monthly by the California Medical Association, San Francisco, Calif. Ten years ago a survey showed that only in one case in a thousand did retinal detachment become "cured." Today, with the improved technique for localization of the retinal tear, better technique of operation upon the tear, and greater knowledge of the possible outcome, the outlook is not so dark. The writer concludes, from his own experience, that in early selected cases fifty per cent of reattachments may be obtained, with useful vision.

Preparing the Child for School, James Frederick Rogers, M.D., *Public Health Nursing*, May, 1933, published monthly by the National Organization for Public Health Nursing, New York, N. Y. Preparation for school, like preparation for life, begins before birth, and is a continuous process. Certain factors, however, should be checked at the time of school entrance: immunization to the contagious diseases, small-pox and diphtheria; elimination of contagious skin diseases; functioning of the sensory organs, particularly those of sight and hearing, and correction of strabismus, where that exists, as well as treatment of any eye disease; nutrition, teeth, and nose and throat conditions should be reviewed to eliminate the possibilities of infection.

The Examination of the Eyes, Oliver P. Bourbon, M.D., *American Medicine*, February, 1933, published monthly by American Medicine, New York, N. Y. An eye physician does not make merely an examination of the eyes for glasses; to him, examination is for the relief of symptoms which point to the eyes as the cause of the patient's discomfort. The eye physician must decide whether the cause is one of eye pathology, systemic disorder, or mechanical peculiarity of the eye, such as is involved in myopia, presbyopia,

etc. The author suggests careful refraction, and that a study be made of the interior of the eye, to discover any symptom of eye pathology or general degenerative disease. All the examinations, he finds, may be made by a non-medical technician, but only a person trained in medicine is able to evaluate and prescribe for the findings.

The Incidence of Color Blindness Among Races, Thomas R. Garth, *Science*, March 31, 1933, published weekly by the Science Press, New York, N. Y. A three-year study indicates that color blindness cannot be considered as a racial attribute although, in testing groups, it was found that an unselected group of whites showed, among males, about eight per cent color blindness, a ratio much higher than among other selected groups—Jews, Indians, Mexicans, Spanish-Americans, and Negroes. This difference may perhaps be attributed to a selective factor not concerned with racial origins.

Book Reviews

The Blind in School and Society. A Psychological Study. Thomas D. Cutsforth, Ph.D. New York: D. Appleton and Company, 1933. 283 p.

A better understanding of blindness will advance its prevention. Those who work for the blind are impressed with the fact that seeing people are generally quite ignorant of the needs of the blind, and of what will best help them. One of the great disadvantages with which the blind have to contend is the lack of understanding of the blind, on the part of the seeing world in which they have to live. The psychology of the blind differs from that of people who have always had good sight. An interpreter who can help the sighted to understand the blind has been needed.

The author of this book became blind at the age of eleven. He has had the advantage which comes to the seeing child through his basic education. He had the energy and persistence to go on with study, through school and college, and graduate study in the university. He has perceived the need for an interpreter of the blind to the seeing world, and has pressed on to investigate this new field in modern psychology.

This book deals with fundamental, emotional and intellectual differences between those who have vision and those who are blind. It will do much to promote better mutual understanding. Better understanding is most needed between sighted parents and their blind children. Parents instinctively feel there is a gap between themselves and their offspring. But there has been no one to show how the gap may be bridged, and what communication can be established across it. Physicians, teachers and social workers must recognize this important need of those blind from birth, and prepare to meet it in every way possible. Careful reading of this volume will help them. The needs of all defective children will be better understood by one who has become acquainted with the psychology of the blind. "The purpose of this book is to help acquaint the seeing with the blind and the blind with themselves. Generally speaking, if a person comprehends a

problem, he can solve it. This is as true of problems of personality as it is of problems of mathematics . . . . The study is offered in dedication to the blind children of 1932, in memory of Samuel Gridley Howe, who initiated the education of the blind of this country in 1832. A century of educational opportunity for the blind has produced no leader more creative or more keenly alive to the vital problems of the blind child." These passages, from the preface, are the best introduction to the book.

The first chapter, of 24 pages, tells of "the preschool blind child." The preschool education of the child is fundamental, and furnishes the basis for all that comes after. Prof. Elliot Smith has shown that the cerebral convolutions develop, along with the macula in the retina which gives our accurate and most useful vision. Seeing and thinking come together. When sight is absent, its contribution must be replaced, as far as possible, by touch, with free motion and locomotion. But the great importance of touch is not understood by parents or teachers. Even in schools for the blind the teaching is directed along lines appropriate for the seeing child. The neglect of parents as to the cultivation of touch, for the perception of the external world—the objective education—must be corrected. All through this book are traced results of this neglect of objective training. It appears in the discussion of verbalism, words instead of reality, the sex behavior of the blind, the emotional and esthetic life of the blind and their problems.

Prevention of blindness must include prevention of its effects. An understanding of its psychological effects furnishes new reasons for such prevention. The most enthusiastic worker for sight saving will find his interest and enthusiasm renewed by a knowledge of what blindness does to the minds of its victims.

The book contains a glossary of medical and scientific terms, with which many readers may be unfamiliar. There is an appendix, stating ten problems for further study; each having a group of suggestive questions growing out of it. There is also an appendix of references, arranged according to the chapters to which they refer. An adequate index completes the book. It is a work of practical value throughout, prepared from a point of view that will be new to its readers.

EDWARD JACKSON, M.D.

The Eye, Ear, Nose and Throat, Practical Medicine Series, 1932. E. V. L. Brown, M.D., Louis Bothman, M.D., George E. Shambaugh, M.D., and Elmer W. Hagens, M.D. Chicago: The Year Book Publishers, Inc., 1932. 686 p.

Again we find before us this little review volume summarizing certain ophthalmological progress. While every contribution to the literature is not summarized in this work, the material is in general well chosen, and the book very convenient as a reference source. It must not, however, be looked upon as a substitute for the abstract departments of the various journals, but rather as a supplement. The reviewer does not feel that editorial comment is justifiable in a work devoted to reviews, as the comments must necessarily be limited to flat statements of opinion without the presentation of evidence to support such opinion, and perhaps leaving an impression in the mind of a reader that a certain really fine study is worthless. These criticisms are not intended to detract from the usefulness of the work. It is certainly very helpful to one desirous of keeping abreast of the times.

John N. Evans, M.D.

Briefer Comment

The Work of the School Nurse-Teacher. Marie E. Swanson, R.N. Albany: University of the State of New York, Bulletin No. 987, January 1, 1932. 87 p.

The school nurse-teacher is in the strategic position of knowing the aims of the school, the problems of the health of the pupils and the circumstances of the home. Hers is a most important task of helping the school and the home to a better fulfilling of the child. This handbook outlines in detail her duties, the techniques of completing them, and furnishes inspiration for the fullest comprehension of the position of nurse-teacher.

Report on the Medical Inspection and Treatment of School Children, Education Health Service, Public Health Department, Glasgow, Scotland, 1932. 58 p.

Description of the full health program for school children undertaken by the Corporation of Glasgow. Clinics for eye diseases, refraction centers for the correction of visual defects, and sight-saving classes are used for the prevention of blindness.

Contributors to This Issue

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As traffic engineer on the conservation staff of the National Bureau of Casualty and Surety Underwriters, **Mr. Maxwell Halsey** has made an intensive study of motoring hazards and means of overcoming them.

Trachoma—its prevention and its cure—has been the special study of **Dr. C. E. Rice,** passed assistant surgeon of the United States Public Health Service; he is medical officer in charge of trachoma prevention at Rolla, Mo. **Dr. Avery A. Drake,** representing the Missouri State Board of Health, is also associated with the work at Rolla.

Supervisor of sight-saving classes of northern Ohio, **Miss Olive S. Peck** has contributed widely to the improved techniques of teaching in special classes.

Among the book reviewers: **Dr. Edward Jackson** is emeritus professor of ophthalmology of the University of Colorado, and consulting editor of the *American Journal of Ophthalmology;* **Dr. John N. Evans** is director of research at the Brooklyn Eye and Ear Hospital.

Concerning Senile Cataract

Luther C. Peter, M.D.

SENILE cataract does not occur in old age only, but may be present in individuals of forty or fifty. These early cases are of a complicated variety and may be caused by a focal infection in some remote part of the body, such as pyorrhea, infected teeth, bad tonsils, gastrointestinal diseases, et cetera

ONE of the sad recollections of my childhood was that of my favorite grandmother, during her last years, groping her way in darkness, led by the members of her family, because of cataract. Preventable blindness is a tragedy in the life of any individual, but when it becomes the lot of those whom we love, who have reached the age of threescore and ten, it arouses within us a something which touches the heartstrings. In a much broader sense, few of us are immune to the feeling of pity for any one who must grope his or her way in darkness, when the means of prevention or aid, so abundantly present everywhere, for some reason has not been available.

It so happens that many of the human family are subject to cataract after fifty years of age. It is a common condition which most people dread, and yet, with all their fear of becoming blind, few exercise even a semblance of care in its prevention or in its arrest. There is a common belief that if it makes its appearance, the individual is doomed to blindness, or to the ordeal of an operation which he fears may destroy what little sight is left. Nothing is further from the truth, and yet every eye surgeon will bear testimony to the fact that this is the true state of mind of the average individual who has senile cataract.

Inasmuch as so many are poorly informed as to the possibilities in cataract, this communication is offered to remove some of the

misconceptions, to create an intelligent understanding as to prevention and arrest of the process, and to banish the dread of operation if such becomes necessary.

What Is Cataract?

Within the eye, back of the iris, or colored curtain, is a small round body, or disc, known as the crystalline lens. When normal, the lens is clear and allows light rays to enter the eye. Its chief function is to allow rays of light and objects to become focused upon the retina—the seeing part of the eye. With advancing years and sometimes in general constitutional diseases or in the presence of focal infections, the lens, which normally is clear as glass, becomes clouded and the condition known as "cataract" begins. When it is mature or ripe, as the laity calls it, the lens becomes grayish white. The black pupil takes on a grayish appearance, and less and less light can enter the eye. Objects become dimmed and hazy, and finally the individual can only distinguish between light and darkness. If uncomplicated by optic nerve disease or by glaucoma (hardening of the eyeball), the patient does not become totally blind because of cataract. He sees, as it were, through frosted glass. When the cataract becomes mature, the lens can be successfully removed, the proper glasses can be prescribed, and the patient can see again as other individuals.

Contrary to general belief, in the light of our present knowledge, cataract may often be prevented in its beginning; it may be arrested by suitable measures; and can be removed before it is ripe, thereby saving the patient months of incapacity.

The Causes of Cataract

A child may be born with congenital cataract. Trivial or severe blows upon the eyeball may cause traumatic cataract at any time of life. We are concerned, however, in this discussion with the type which is commonly known as senile cataract. It is a misnomer in that it does not necessarily occur in old age, but may be present in individuals of forty or fifty. These early cases, as a rule, are of a complicated variety and are due to a focal infection in some remote part of the body, such as pyorrhea, infected teeth, bad tonsils, gastrointestinal diseases, and other remote infections,

as well as to constitutional diseases. People who live in the tropics, and those who are exposed to great heat, like glass blowers, may be similarly afflicted early in life.

From fifty years on, one of the usual forms of senile cataract may develop. The causes are many, and the same individual may have multiple factors which contribute to its formation. Some of the causes may not be frank focal infections, such as those to which I have alluded, but they may be present in diluted form and act as contributory factors.

In the study of the anatomy and the physiology of the eye, one finds that the lens does not have a blood supply of its own, but draws its nutrition from other nearby structures. In advanced life the nutrition of the eye, as well as that of the body in general, suffers as compared with early life. It is quite natural, therefore, to expect a tissue, which does not have a direct blood supply, to be the first to show lack of nutrition. This is true of the crystalline lens, and its fibers, which originally were transparent, lose their clearness, and opacities begin to form. These opacities fortunately begin as a rule in the peripheral part of the lens back of the iris, and not in the center through which we see. Cataract, therefore, can be well under way, and the patient may not be conscious of any visual defect. In such cases it is only when the physician or eye surgeon uses suitable drops to dilate the pupil, that he can uncover the condition at a time when much may be done to arrest the process. When opacities appear in the center of the pupil, the individual becomes conscious of a reduction in vision, and cataract is well on its way. The natural loss of nutrition, which comes with advancing years, often is the beginning of cataract formation. It may be hastened by ill health, by focal infections, by overwork, and by neglect of general health principles.

The Influence of Defective Vision and its Neglect

A most important contributing factor is defective vision resulting from astigmatism and neglect in the use of glasses to correct such defects. All the causes which have been mentioned are potent influences in the formation of cataract, but eyestrain, of which the patient may be conscious or unconscious, probably plays a larger rôle than any individual factor which I have discussed.

Uncorrected eyestrain, even in early life, causes a low type of chronic congestion which may play a prominent part in cataract formation later in life. It is particularly important for people in their forties to use glasses to aid in reading when they find they need very good light in order to read comfortably, or when they find it difficult to look up numbers in a telephone directory. Many people take pride in feeling that they do not need glasses, but it is the pride of ignorance.

Few individuals after forty-five years of age are able to read comfortably without the aid of glasses. Many do, but they are unqualified, self-appointed judges, and many are led to continue the practice by false pride, lest the wearing of glasses betray their age. As a matter of fact, their frantic efforts to read at arm's length furnish a greater betrayal of their years and, in addition, what is of more vital importance, they are encouraging future trouble which may not readily be repaired. The laws of nature deal rather equitably with humanity, and the age of forty-five, as a rule, marks a period in the lives of all when glasses are needed for close work. The few who elect themselves to be the exceptions, if put to proper tests, could not qualify as a favored group.

Can Cataract Be Prevented?

It is quite in order to ask, "Can cataract be prevented?" The answer is emphatically yes, in many instances. One hears much of periodic health examinations. Life insurance companies find it so important that they offer such periodic examinations free to all their insured. If it is profitable to the companies, how much more worth while should it be to the people who are insured; and if it is profitable to those who carry policies, it should be and is equally valuable to those who are not insured and who, so to speak, carry their own risks. In these instances, however, the examinations fall short of thorough eye studies. The eye is an early index to many constitutional and to cardiovascular diseases, even before they are generally recognized. Such study, if thorough, would uncover the earliest evidence of cataract. If the eyes were examined every third year after the age of forty, many general conditions and many cases of cataract in the earliest stages would be recognized, and treatment might prevent their further development.

Long before the age of forty, if the individual is troubled with red lids, defective vision, unexplainable headaches which develop during the day, or drowsiness on reading or doing close work, an eye physician should be consulted for a thorough study of the eyes. After forty, a comprehensive study should be made without regard for the presence or absence of symptoms. Such procedures would offer to the individual a health insurance policy from an eye, as well as from a health, standpoint, which would pay worth while dividends, with comparatively low premiums. Cataract is most insidious in onset, and its early recognition is of much value in the matter of treatment.

The study, however, should be carried further, and general periodic health examinations should be made with a view to uncover bad teeth, infected tonsils, gastrointestinal toxemias, and other remote foci of infection, as well as constitutional diseases, all of which may contribute to the formation of cataract. From many patients who have cataract, especially of the complicated variety, one can elicit the history of joint pains, stiffness, or frank arthritis, and the eye and joint diseases are found to be caused by the same etiologic factor.

Can Cataract Be Arrested?

Until recent years the layman dreaded to hear the verdict pronounced, "You have cataract." It was tantamount to blindness eventually, or the expense and ordeal of a series of operations for its removal. The medical profession offered little more than, "I can change your glasses, and when the cataract is mature, it can be removed." Such teaching is not unlike telling a patient suffering from pulmonary tuberculosis, or any other chronic illness, that his case is serious and the prognosis or outlook is hopeless. The march of progress in medicine now permits us to say, "You have such and such a disease, but if you follow approved and tried medical advice, you may recover." The instances of chronic Bright's disease and diabetes are even more to the point. Skilled medical guidance carries the victims of these diseases through years of usefulness, and such patients often die, not from these causes, but from some intercurrent acute illness.

Much can be done to arrest the development of cataract.

The eye physician of today, who is recognized as a modern and up-to-date specialist, will do much more than prescribe glasses for his cataract patient and await the time when the cataract can be removed by surgery. He will make a careful study of the eye and, in addition, will study, with the aid of other skillful physicians, the entire body, to uncover the cause of the cataract. If focal infections can be eliminated, and constitutional diseases can be brought under control, these factors, which often contribute to cataract formation, cease to elaborate their poisons and toxins.

A third step is necessary, however, in arresting the development of cataract. This consists of local methods of treatment which tend to improve the general nutrition of the eyes. These local measures are technical and vary with the physician's training and experience. All, however, are administered to obtain the same end, namely, an improvement in the nutrition of the eye tissues.

A fourth and final step in arrest of cataract formation is the advice given to patients by eye physicians to save the eyes from unnecessary strain and abuse. It is not only necessary to prescribe glasses with care and precision, but the patient should be instructed in the proper use of his eyes with good illumination, etc.

In the experience of many patients, there may be some who have not been treated as outlined above. Those, however, whose good fortune it may be to fall into the hands of physicians who are well trained in their art will have the satisfaction of knowing that most cases of cataract can be retarded, and in many instances patients can be carried through life without the necessity for operation. The important factor is treatment in the early stages of the disease.

If the patient waits until sight is impaired before consulting an eye physician, or if the proper effort is not made to find and eliminate the cause or contributing factors, operation becomes inevitable. Waiting until vision is reduced, or until the reduction is evident to the patient, involves a much greater risk. A diagnosis of cataract is often made by laymen and by physicians who are untrained in the recognition of eye diseases, when the condition really is glaucoma (hardening of the eyeball). This is a serious mistake. Glaucoma, like cataract, if recognized early, yields to proper treatment; but if it is recognized only after vision is much reduced, the danger of ultimate blindness is great. A

careful periodic health examination of the eyes, therefore, is of the utmost value to patients after forty years of age.

Modern Methods of Surgery in Cataract

As stated above, many patients call upon the eye surgeon when vision is much reduced and surgery is necessary. Those who are brought face to face with the question of surgery ask many questions as to the probable outcome. Most important in these logical questions may be found the following: What risk am I taking in losing what sight I have? What are my chances of continuing my occupation after operation? Am I too old for operation? Should both eyes be operated on? How long must I be in the hospital? Must I wait indefinitely until the cataract is mature (ripe)?

What is the Risk?—During the past century, eye surgeons the world over have studied and improved the simple but somewhat crude procedures of years ago, until today the answer to the first question is most satisfactory. With modern precautions and safeguards, and modern technique, few eyes are lost even in the hands of those who operate infrequently. Naturally, refinements in the ultimate results will vary with the operator and the method of extraction which is employed. The cataract operation is probably the most delicate in all surgery, and the final results will depend upon two factors: the first is the surgeon, and the second is the patient. The average seasoned surgeon is a safe operator. Much, however, depends upon the patient. A co-operative patient as a rule, obtains excellent results in the hands of an average surgeon. A non-co-operative patient may mar the best efforts of an experienced surgeon. Through the modern methods of preparation, the patient enters the operating room with confidence and trust in the operator's ability, and co-operates to the fullest extent with the happiest of results.

Chances of Recovery.—What are the patients' chances of recovering sight which will enable them to continue their occupations? This is a question of much concern—a vital one in many instances. The answer today is, "Their chances are excellent." Much depends upon the method of operating, to which reference will be made. As a rule, most occupations can be resumed after recovery from operation. The refinements of surgical technique

are such that visual results are excellent; in fact, in many individuals, as good as the vision before cataract developed. The pleasure of reading and working at the near point, and the prospects of again following a gainful occupation are worth while goals towards which patients, plunged into semidarkness and incapacity, may look forward with hope and confidence.

Age in Cataract Operation.—The question of age is equally reassuring. Age, as a rule, is not a barrier to cataract extraction. There is a little more risk in operating upon a patient of eighty than upon one in the sixth decade. This risk depends largely upon the heart and vascular system. With the care which is usually exercised by the modern surgeon, old age becomes a serious problem only in the exceptional case.

Operation on Both Eyes?—Shall both eyes be operated upon? Each case becomes a law unto itself, and the surgeon in charge renders the decision for each individual case. In a general way, both eyes should be operated upon in patients under seventy-five. In older patients, one good eye may be sufficient for the patient's needs.

If one eye is good, shall the cataractous eye be subjected to operation? As a rule, if one eye is good, and cataract is mature in the other eye, the cataract should be extracted promptly. An overripe cataract is a menace which cannot safely be left to chance. It should be removed.

Hospitalization in Cataract Operation.—The last questions, as to the length of stay in a hospital and the immaturity of the cataract, may be answered together. They involve the problem of the most approved method of extraction, upon which the layman should be informed.

Methods of Cataract Operation

In the beginning of this communication, I referred to the progress made in the refinements of cataract extraction. In no department of surgery has progress been greater. In order that the reader can better understand the difference between the old and the new methods as now practiced, a brief description is necessary. The lens is surrounded by a capsule or covering. In the older methods of surgery, after opening the eye and enlarging the pupil by an

iridectomy, the capsule is incised, or a part of the capsule is removed by sharp forceps, after which the cataract is expressed from its capsule and through the corneal wound. If the cataract is not mature, soft lens particles are often left in the eye. The retained particles, inflammatory exudate, and remaining lens capsule may not leave a clear pupillary space. A needling or discission operation then becomes necessary, in order that a clear opening may be made through this secondary cataract formation, so that the patient can see. Those who do a two-stage operation, first, do an iridectomy; second, express the cataract; and as a third stage, if necessary, do a needling operation.

In the newer methods, the lens capsule is not broken, but the capsule and cataract are lifted out of the eye as one body. This leaves a clear black pupil, and a needling is unnecessary. To enhance the value of this type of operation, the pupil is not enlarged, but left round as it was before operation. Two methods of extraction are now practiced. Either the lens is lifted out by smooth capsule forceps, or the lens is grasped by a small vacuum cup and is lifted from the eye in its capsule by suction. In either form, the operation is known as "cataract extraction in capsule." The older method is known as "expression operation," or sometimes is called "extraction with capsulotomy," meaning thereby that the capsule is ruptured, the lens is expressed through the opening in the capsule, but part of the capsule is left in the eye.

In the early days, a two-stage procedure was advised, and in some instances, a forced third stage was necessarily added to the technique. This was thought and even now is believed by some, who have had no experience with the newer technique, to offer an element of safety to the extraction which a one-stage operation might not possess. To be admitted to a hospital two or three times in order to obtain good results in a single eye, adds unnecessary expense, tax upon the general system, fear, and apprehension to a patient which modern surgery, in the hands of the experienced, has removed. There are rare instances in which a two-stage operation may be necessary, but in all other instances, a single operation, barring unforeseen accidents, is sufficient. For such operation, properly performed, nine to ten days is an average period for hospitalization.

Extraction in capsule is not new. It dates back well into the last century, but the safeguards now available, and improvement in technique, offer the prospects of more rapid convalescence and better vision than the usual expression operation. It, furthermore, eliminates many of the complications incident to the older and more frequently practiced method. If, in addition to this modern technique, a round pupil is preserved, the ultimate cosmetic results are much better, the patient is spared the annoyance of light glare, and vision is better and more comfortable than that which can be obtained by the older method.

When is Cataract Ready for Operation?

A final question is frequently asked, "Is my cataract ripe and ready for operation?" If the vision is good in one eye, so that the patient can carry on, this question is given little thought. In former years and even today, those who practice the older method of operating await full maturity before they advise surgery. Many a man is thereby deprived of the means of earning a living, and all cataract patients so treated grope in semidarkness while awaiting maturity. Modern methods of surgery make this unnecessary. It is possible to remove a cataractous lens successfully when the patient reaches the stage of incapacity for work, and long before the cataract is mature. Many months and even years of enforced idleness, loss of earning power, and above all, protracted anxiety can be avoided.

Progress in the management of cataract has opened three sources of hopefulness. The first furnishes a means of avoiding many unnecessary cases of cataract formation by preventive measures, periodic health examinations, including the eyes, and care in the wearing of glasses if needed. The second reason for a hopeful outlook is furnished by the program which, if properly followed, may arrest the process in many instances and render operation unnecessary. The third and most heartening of all measures to raise the hopes of those who are threatened with semiblindness from cataract is the progress made towards better surgery with increased safeguards to insure better results, a shorter period of hospitalization, and the ability of the surgeon to save his patient many months of anxious waiting and total incapacity with its accompanying economic loss.

Lighting for the Conservation of Vision

Percy W. Cobb, M.D.

WHILE no effort should be spared to improve lighting conditions to the very highest practicable degree, explains Dr. Cobb, it is folly to expect lighting alone to effect benefits if the eye defects are not corrected by competent medical attention

THE activity that we call vision may be looked upon as a co-operative affair between the eyes, or organs of vision, on the one hand, and the light, without which they are useless, on the other. Since in this joint enterprise the eyes are the active and principal participant, it might easily be supposed that a slight defect in them would outweigh large deviations from the best possible in the intensity and distribution of the light; the more so since during the centuries before the control of fire, while primitive eyes and human eyes were being evolved, no control whatever over the light or lighting was possible, and the eyes have presumably, during that unbelievably long period, come to adapt themselves to what is at hand. As a matter of fact, the exact work which has been done upon this question all supports the hypothesis. A small defect in the eyes themselves proves to be a far greater handicap to the process of seeing than does any defect in the lighting system that is ever likely to be encountered where even limited care and intelligence have been used. Even so, however, whether one is an employer, anxious to get the best return from the labor he is paying, or a philanthropist, anxious to conserve human health and happiness, it would seem worth some cost to remove a moderate or even a small handicap from the eyes.

There are several more or less distinct goals toward which the effort must be directed in the design of artificial lighting. In rating these it would be hard to place them in the exact order of their im-

portance. Possibly the order will rather be historical. These objectives are, at any rate: (1) safety; (2) comfort and ease in activities which do not especially tax the organs of vision; (3) aesthetic enhancement of the surroundings; and last, but certainly not least (4) the ease and facility of fine and close eye work.

From the standpoint of conservation of vision, the fourth consideration stated above, namely, the ease and comfort of long continued work, such as taxes the organs of vision, would seem to be the first consideration.

The Visual Field

If we think of a person working, possibly at writing or reading, we can imagine his eyes at the center of a sphere—rather, let us say, a hemisphere. The point upon which his eyes are fixed at the instant, we will call the pole of this surface. From the pole we can imagine meridians drawn—horizontal, vertical and oblique—and drawn about the pole we can imagine circles or parallels of latitude, each of which represents a certain angular distance from the pole or point of fixation. This gives us a chart or map of the visual field, and upon each point of such a chart we might indicate the brightness or stimulus-value of the outer object, whatever it is, which is in line with this point. This map would then, something after the manner of a relief map, exhibit a complete approximate account of the brightness or intensity of stimulus acting upon the retina at each image-point corresponding to a point on the sphere. Such a chart would be a statement of the light conditions under which the eye has to work at that instant.

In experimental work simple conditions have often had to be planned. The actual practical distribution of brightness in a given visual field is generally too detailed for simple statement. Then, again, the time factor must be taken into account. The eyes shift about, while the external objects are stationary, and the whole picture on the retina is thus slid about accordingly. However, the visual field remains a logical and convenient frame of reference, within which, by specifying the angle of meridian and the angular distance for the center, we can specifically locate the character and intensity of any factor in the light conditions affecting vision.

Then, as to the test of how vision is affected by these factors.

This has most often been made at the pole, or point of fixation in the field, which corresponds to the fovea of the retina where the acuity of vision is at its highest. It must be borne in mind, however, that in rapid work—in reading for example— it has been

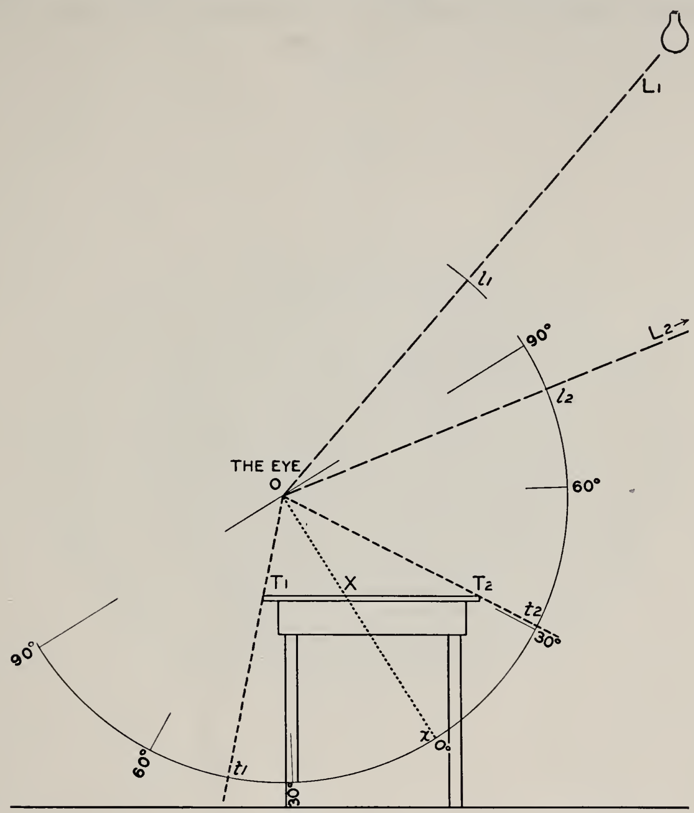

Figure 1.—The visual field. The hemisphere is drawn about the eye at **O** as a center. **X** is the fixation point (or work). Its projection is at **x** on the sphere, which is made the center of the map. The edges of the table, $\mathbf{T_1}$ and $\mathbf{T_2}$, as well as the light sources, $\mathbf{L_1}$ and $\mathbf{L_2}$, are similarly projected at other points. Compare Figure 2.

found that the eyes do not glide along the line of print, but make several jumps along the line, landing for a brief period, and landing, not on the larger and more distinctive words of the text, but as a rule on the shorter and commoner ones.[1] In addition, it has been shown that during the jump, while the eye is in flight, nothing is seen.[2] The wires are disconnected, so to speak, during that brief

interval, and the blur and confusion that would otherwise result is so avoided. It follows from this that the more important and distinctive details of the print are taken in while imaged, not at the center of the retina, but a very few degrees away from it. This consideration has occasionally led to the choice of a test point not

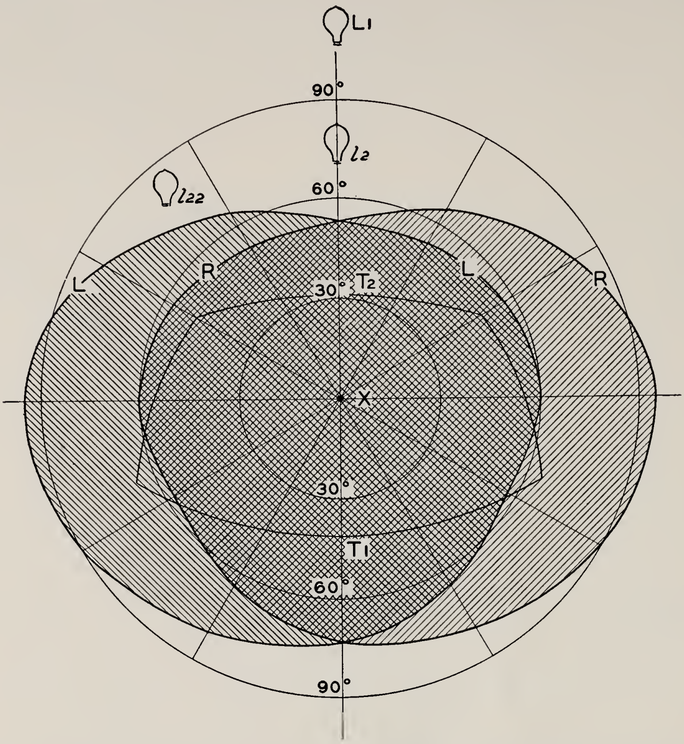

Figure 2.—The map of the visual field. The fixation point is central at **X.** **R R** and **L L** represent the limits of the sensitive right and left retinas. The light $\mathbf{L_1}$ is outside the map. The light $\mathbf{l_2}$ is not within the sensitive area. In case it is to the left, rather than straight in front, it might be represented at $\mathbf{l_{22}}$. The table top is indicated by $\mathbf{T_1}$ and $\mathbf{T_2}$.

at the exact center of the field, but a very few degrees away from it. Possibly the advantage of this is more academic than real. It is much simpler, especially with unaccustomed subjects, to let them do as they invariably will unless otherwise instructed. That is, to fix the eyes directly upon the test-object when asked to report what they see there.

Tests of Visibility

The particular form of test used has been various. The conceivable number of possible tests of visibility is legion; and no test has ever been shown to have universal significance. Some of those that have been applied may be mentioned. Historically first is the visual acuity test as used by the ophthalmologist, or some simple modification of it, of similar significance[3]; the least perceptible difference in brightness between two halves of a small bright field[4]; the power to sustain clear seeing of a small object placed at a distance just within the limit of visibility so as to be of fluctuating clarity, measured by that fraction of a limited test period during which the object is seen clearly[5]; the accuracy, guided by vision, of the ability manually to adjust a marker to opposition with an irregularly moving one.[6]

Another point has to be mentioned; then we can discuss some of the results. The test may be used in two ways. First, we may continue some form of task involving vision, over a protracted period under a given set of light conditions, and note the progressive decline, if any, in the output of work. This has been done in the laboratory, and the various work tests which have been conducted in factories, under various lighting installations, fall into this class. In this case the work is itself the test. Second, a specially devised test may be conducted before and after a protracted period of work of any appropriate sort under the conditions which are being investigated.[5] In the second case, the decline in the result is to be interpreted as a measure of the cumulative effect or "fatigue" which has come about under the conditions of the work period.

Results of Experiments on Visibility

The foregoing is an attempt, in brief, to give a bird's-eye view of the experimental work that has been done. This work has, in some respects, been disappointing from the fact that practical visual conditions, as they might be mapped in the visual field, are invariably too detailed and complex to make possible the calculation, from the experimental results, of a prescription for the best or most efficient lighting distribution; and also from the fact that often the differential result is so small, even after protracted ex-

perimentation, and so variable, that one has doubts as to its significance or importance. Still there are certain results which have appeared, first and last, which may be generally stated.

1. Some conclusions that had been reached by common observation and judgment have been confirmed.

2. Rather definite limits have been set as to the effectiveness of these and other influences.

3. At least one fact has appeared which has not been accounted for by measurements of visibility such as have been outlined.

The grossest insult to the organs of vision is a light source disposed so that it sheds light directly into the eyes of the worker, *i.e.*, so that it lies in his visual field. However, this is not so bad, provided its intensity is not too high (in general, not higher than would be accounted for by the illumination on the work); provided it is not too near the eyes; and provided it does not lie too near the line of direct vision. It has been found under conditions otherwise resembling those of practice that unless the light source is within 25 degrees of the center, vision will not thereby be measurably affected.

Impairment of Visibility by Glare

But a light source in the field of vision gives rise to another sort of disturbance, aside from the impairment of sensitiveness as measured by a visual test. This is a feeling of discomfort or of glare. For this there is no measure except the testimony of the subject, but this is so positive and so universal that it simply cannot be disregarded. To some extend, it parallels the findings of the visual test; but there is a difference. Suppose the glaring source is a highly concentrated one, such as, perhaps, a visible incandescent lamp filament. There is a measurable reduction of visibility at the center of the field and, at the same time, the subject reports a definite discomfort from the source. Now suppose the lamp is enclosed in an opal globe, but still remains in the same place and sends the same quantity of light into the eyes. The discomfort is immediately diminished, or disappears altogether, but a test of visibility gives the same result as before. Thus while the impairment of visibility is found to depend, other things remaining the same, upon the total light that enters the eye from the source,

regardless of the extent of the source in the visual field, and hence regardless of the area of the retina (within certain limits of course) over which its direct light is spread, it is otherwise with the concomitant discomfort, which diminishes greatly and at once when the same quantity of light comes from a larger area in the visual field and is spread out correspondingly thinner over the sensitive retina.

Such concentration of emitted light is extremely high in the bare filament of a modern incandescent lamp. This has been met by the universal use of frosted lamps in the smaller sizes, and the invariable recommendation that the larger sizes be enclosed in a diffuser of some sort—most often, perhaps, an opal enclosing globe or something similar; and by the further rule that direct light from the lighting unit should not, if it can be avoided, be allowed to enter the eyes.

Avoidance of Glare

This last requirement, practicable in some cases, can obviously not be met in case it is a large room—office or factory, say—which has to be lighted. The general practice here is to mount the light units fairly high, a few feet above the head of a standing person, and to space them so as to yield a satisfactory and reasonably uniform illumination at table height throughout the room. The fixtures are designed to shed light chiefly downward, and so as to direct a comparatively small amount of light horizontally or at angles near the horizontal. Thus, a person with his eyes directed across the room finds that those sources which are near the center of his visual field are the ones farthest away, and send little light directly into his eyes; while the nearer ones are at a much greater angular distance from the center, and become innocuous for that reason. Thus the problem of glare, or direct light in the eyes, has reached a satisfactory compromise.

In passing, it is to be remarked that the conditions to be met by the individual worker in such a room are by no means described when the lighting arrangements have been specified. Obviously, a person working near the wall of such a room will have quite a different visual outlook if he works facing the room with its array of lights, than if he turns about and faces the wall, thus putting the light sources behind him. It can easily be seen, too, that

merely shifting the eyes under the former condition will, for the time being, alter the whole map of the visual field.

The impairment of visibility with light sources in the field of view has its parallel even in the case of very extended light areas. There are few who have not noticed how difficult or impossible it is, while in a brightly lit room, to see through the window what is going on in the dim light outside; or again, when out of doors in the daytime, to look in through the window and distinguish objects in the interior. In both cases, the contrast darkening effect steps in and prevents the clear seeing of objects lying within the relatively small and dark area of the visual field, and when we wish to see what is going on outside at night, it is often quite effective to darken the interior.

However, it will not do to go to the opposite extreme. At first thought, it might seem that the best condition for vision will be the exclusion of all light, except only a narrow beam, wide enough to cover the work area, and to leave the remainder of the field as dark as possible. Against this plan, there is the weight of several important arguments, from common sense, from common experience and from experiment. To begin with, the environment under which the race has grown up, in the evolutionary sense, has seldom, if ever, challenged the eyes to become adapted to such conditions. Widespread daylight, or the equally widespread and dim light of the moon and stars have been the rule all through the eras since life began. Further, the experience seems to be general that reading for a long period, with the paper held near the only light source in the room, is very apt to lead to discomfort, to a tired and possibly "sandy" feeling in the eyes, and eventually, often, to sleepiness.

Finally, experiment has something to say which gives definiteness to all this.[7] A small test field, of perhaps two or three degrees' diameter, can be arranged so that it may be presented on an extensive background of widely variable and measurable brightness; and arrangements are made to measure the sensitiveness of vision within this small central field. As the outer area is increased in brightness above that of the test field, this latter turns gray, and then black, by contrast, and it is found that vision thereon is reduced—enormously reduced under extreme conditions. If, how-

ever, we go the other way and diminish the brightness of the extensive background, we find that, to a certain extent, the same thing takes place. In spite of the fact that the small area becomes more brilliant, perhaps even glistening, as its background grows dark, visibility within that area is reduced; and although this impairment is minor, as compared with the opposite case, it is inevitable. Not only is it, of itself, an unfavorable finding, but it suggests a physiological condition which might reasonably be supposed to have much more far-reaching consequences in the long run. While this is, of course, a somewhat speculative conclusion, it must not be forgotten that the reports of common experience, under settings similar to this, point the same way.

General Rules for Good Lighting

Enough has been said so far to make it possible to lay down certain general rules which may be followed in providing lighting. The plan of general lighting has been described in which units are installed at regularly spaced intervals, some feet overhead, these units being so designed that the light is directed mainly downward, avoiding to a large extent the evil of glare from light horizontally directed into the worker's eyes. Such a plan provides lighting which has been found practically adequate for a great many forms of work, provided the intensity is sufficient. If one asks what the intensity should be, the most general answer that can be given is that it is never too high. Tables have been prepared by lighting engineers, giving recommended intensities of illumination for various forms of work. It might truthfully be said of these that the values of foot-candles given are minimum values; that to go below them would be to make the work more difficult for the eyes; that to go above would certainly be entirely without harm of any sort except increased cost, and might, in fact, possibly yield a corresponding advantage for vision. Natural light in the open is so far above any intensity ever proposed for artificial light, that the danger of too much is out of the question. It is a very dull day when the light from the sky falls below 500 foot-candles. If this intensity were to be attempted in any system of artificial lights of the present time, special arrangements would have to be made to get rid of the excessive heat.

Thus the real danger of going wrong in the direction of too much light is a vanishing one. However, the question of how that light is to be applied is a matter of moment. The consideration of glare, or direct light from the sources, has been mentioned, and it has been shown how a working compromise has been reached in lighting for work. In this connection it must be remembered that shiny surfaces such as glossy paper and polished or glass table tops in an office, or metallic surfaces in a machine shop, may reflect light from the sources into the eyes, and prove worse than the sources themselves, for the simple reason that the reflected light comes to the eyes from the direction of the work, or nearly so, and cannot be avoided as are the sources themselves, when the eyes are directed somewhat downward as they usually are. In thinking of glare, then, the presence of polished or shiny surfaces must be taken into account, as well as direct light from the sources.

Lighting Requirements of Special Types of Work

Something will also depend upon how the light falls upon the work-area. The general lighting, as has been described, usually aims to attain a certain number of foot-candles on the table-top level, say 30 inches from the floor. This light comes chiefly from above, that is, from many directions, and at angles not very far from the vertical. For many purposes this does very well. But for the best results the nature of the work has to be considered. To illustrate this point, let us picture one or two situations involving shadows. First, suppose the object to be seen is a thread, lying on a fabric of the same color. It is easy to see that the shadow of the thread may be the very thing by which the eyes locate it. Hence, in this case, light coming from all directions will put the worker at a disadvantage, in that the shadows of the thread will be numerous and dim; while a fairly well directed light from a single source will cast a deep and unequivocal shadow, and readily reveal the location of the thread.

The antithesis to this benificent effect of a shadow is the case in which the details to be seen fall entirely within the shadow, as in trying to read with one's own head, or someone else's, interposed between such a single light source and the page. Or, what is much worse, as anyone who has tried it will know, the case of a draftsman

attempting to draw a line in the deep shadow cast by his straight-edge. This, indeed is an attempt which is made but once in a life-time, and the draftsman will either rearrange his light, or rearrange his table and himself, to obviate that situation. This is perhaps one of the cases in which general illumination, coming from many directions and chiefly downward, is at its best.

We see then, that shadows are neither an unmixed blessing nor an unmixed evil. They are a factor which has to be dealt with, especially when the general lighting of a room is supplemented by local lights at the work-places, that is to say, when we begin to light the work instead of merely lighting the space. Then each particular routine job that arises in the division of labor becomes a lighting problem in itself, for which, as we saw in the case of the shadows, no rule can be laid down. Each case must rest upon the nature of the work and the ingenuity of the lighting engineer, in order that the light supplied at that work-place may be best adapted to the vision of the worker in seeing that particular thing, whatever it is, which is the critical thing in the fulfillment of the work for which he is there.

The movement in this direction may go even farther, to the development of various kinds of special or "trick" lighting, each designed to facilitate some highly special operation. For certain reasons, probably of an economic nature, lighting engineers have not interested themselves in these problems to any great extent, and it has remained to the alert and ingenious shop superintendent to design and build such devices. In all cases, to repeat, the element of glare is to be avoided. Direct light from the source or sources, or from mirror-like surfaces, should not be allowed to fall into the eyes.

Importance of Correcting Eye Defects

This discussion will end with a warning which was sounded at the beginning. The examination of a large number of employees in the post offices in New York revealed the fact that not more than 10 or 20 per cent had normal vision in both eyes, with freedom from eye defect of one sort or another. Some 60 per cent of the whole number were able to show normal visual acuity in one or both eyes. This latter figure, of course, includes cases of defective

vision. A survey of large numbers of employees in ten different industries showed a corresponding figure ranging from 41 to 87 per cent. That is, this percentage had normal visual acuity in one or both eyes, but, even in these, the presence of defect was not excluded. This is enough to show the high prevalence of visual defect among factory and office workers.[8]

We shall not stop to discuss the question whether or in what degree modern conditions of work are to be assigned as the cause of these defects. Unquestionably, in large part, it has been modern conditions of work, and modern medical knowledge of the organs of vision, which have brought these facts to light. They exist. And while no effort should be spared to improve lighting conditions to the highest practicable degree, and so to bring about increased efficiency and comfort, it is nevertheless folly to expect lighting to effect benefits such as only competent medical attention can afford. Such defective eyes demand correction, as far as possible, at either public or private expense; and when this proves insufficient, a change for the worker to a job which makes demands upon the eyes not in excess of their capacity.

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What Can an Organization for the Blind Do in Preventing Blindness?*†

Conrad Berens, M.D.

IF our highest ambition is realized, says Dr. Berens, we may ultimately reduce the number of the blind to about 25 per cent of the present total

MORE than fifty years ago a distinguished authority said that one-third of all blindness should have been prevented, one-third might have been prevented, and only one-third was inevitable. Statistics obtained from the British Isles only twelve years ago form the basis for a similar statement made by Dr. Bishop Harman of London. Active co-operation with the Committee on Statistics of the Blind, reviewing recent data on the causes of blindness, justifies the statement that probably not more than 25 per cent of blindness is inevitable.

When we consider that the first active effort to work with the blind was instituted 150 years ago, we can but admire its remarkable development. Organizations for improving the conditions of the blind were obliged first to undertake work of the most urgent nature, and the importance of their contribution in providing opportunity, care, education, training, and means of existence for those handicapped by loss of sight cannot be overemphasized.

It is encouraging that this Association and others which work with the blind are also sponsoring work for the prevention of blindness. In this paper I hope to outline a few of the activities which may be of value in this work. As knowledge of the causes of blindness increases, efforts to help the blind must include, in so far as

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possible, the elimination of factors responsible for their condition and the institution of energetic preventive measures. Although it is agreed that those who are blind should be assisted in every possible manner, efforts to prevent the future need of this work are as commendable as the recognition of the importance of preventive medicine.

I am happy to be able to demonstrate, by means of concrete cases, that measures directed toward the prevention of blindness by certain agencies and institutions caring for the blind undoubtedly have resulted in preventing much unnecessary blindness, and furthermore have been instrumental in restoring sight to many who were considered permanently blind.

In presenting a program for the prevention of blindness three activities must be stressed: (1) Co-operation with ophthalmology and medical sciences in obtaining information as to the causes of blindness and means through which blindness may be prevented and good vision may be conserved; (2) the interpretation and dissemination of this information to the public; (3) co-operation with other agencies so that laws may be enacted and social conditions improved.

Co-operation with Ophthalmology and Medical Sciences

Blindness from certain causes will often yield to treatment or operation, *e.g.*, cataract, etc. In other cases, where vision has not been entirely destroyed, the progress of the disease may be arrested and sometimes an improvement in vision effected, *e.g.*, keratitis, glaucoma, etc. Only a physician who has made a special study of diseases of the eye can diagnose the condition accurately and judge the possibility of improvement or cure. The lay worker, however long his experience, has not the necessary knowledge or skill to do this and should not undertake the responsibility of attempting it. It cannot be overemphasized that until the opinion of a competent ophthalmologist has been secured, the agency for the blind should not assume that the new client is necessarily and permanently blind. The importance of this statement was vividly illustrated recently in a study of the causes of blindness. The examination of data from several schools for the blind disclosed the fact that vision in many cases was so good that even

without operation or special treatment these patients should not have been considered as candidates for a school for the blind.

Routine Examinations.—However incredible it may seem, there is proof in homes and schools for the blind that the co-operation of eye physicians has not been obtained in making examinations of persons reported as blind. For example, Dr. J. E. Blaydes[1] showed that in one school for the blind with an enrollment of 114 pupils, the sight of 11 could be restored to normal; 8 could be improved to practically normal (20/30 to 20/50); 7 could be given vision sufficient for reading (20/50 to 20/70); 3 could be given vision of 20/100 to 20/200; and 3 could have "travel vision" (5/200 to 10/200). Thus 32 of 114 pupils—29 per cent—in one school for the blind might have had their sight greatly improved by proper medical and surgical attention.

At the time of the survey of schools for the blind which was made by one of the subcommittees of the White House Conference on Child Health and Protection it was found that in 44 schools, having a total enrollment of 4,195, there were 673 students (16 per cent) having sufficient vision to permit their reading ink print.[2] It seems unnecessary to recount the advantages to children of being transferred to sight-saving classes rather than being classified as blind.

It is likewise true that men and women, after having been classified as blind, have been thoroughly examined by an eye physician who found that vision could be improved to such a degree that many of them could be self-supporting in occupations requiring sight. Our statistics from the Lighthouse Eye Clinic of the New York Association for the Blind show that between November 1, 1932 and May 27, 1933—a period of seven months—50 patients reported to be blind were transferred from the blind to the seeing classification. The summary follows: The vision of 18 patients was restored to normal by means of glasses; the vision of 23 was improved by glasses; 4 were improved by treatment; and operation improved the vision of 5. Previous to their re-classification, a number of these patients had received financial aid and subsidized employment.

The records of the Lighthouse Eye Clinic furnish the following case report: E. F., age 65, formerly a waiter in a restaurant.

Cataracts developed in both eyes twenty years ago. The left eye was operated on immediately. Postoperative complications resulted in loss of vision. At that time and at subsequent observations he was advised not to have the right eye operated upon. After the patient was examined at the Lighthouse Eye Clinic, the symptoms in the eye previously operated upon were diagnosed as arising from a focus of infection. Following treatment, an operation was performed on the right eye. His vision is now 20/15.

A case recently reported was that of a woman who, for nine years, had been considered blind and had been receiving social service and subsidized employment from an agency for the blind. When an eye examination was arranged for, it was found that, fitted with the proper glasses, she had practically normal sight.

These are only a few instances of the saving of money and effort, to say nothing of the increased happiness of the individual, which may be achieved through a routine eye examination. When the client still retains a certain degree of vision, it is important to know what the visual acuity is and what activities he may safely engage in without jeopardizing that sight. In this, the opinion of the eye physician is essential.

For these reasons, in every agency an eye examination and diagnosis by a competent eye physician should be one of the first steps in procedure with a blind client. If the patient has been under the care of an ophthalmologist, a re-examination may not be necessary, but in such a case the agency should consult the ophthalmologist immediately and secure as full a report as he is able to give. Other exceptions to the general routine will be found; for example, very aged or feeble clients, those who have had both eyes enucleated, and those who live in isolated districts where no physician is available. Nevertheless, it will be found that in most cases an examination can be arranged for, and it should therefore be established as a routine procedure to be departed from only when exceptional circumstances justify it.

Certain agencies may feel that routine eye examinations are impractical because of the expense involved. It may be that they have no funds to pay for such examinations, that their clients are unable to pay for the services of a private physician, or that no ophthalmologist is available. In such situations, however, an

effort should be made to secure the co-operation of the county medical society or some similar body, in making the necessary eye service available. Lions Clubs or other volunteer groups are usually willing to defray the necessary expenses of travel, etc., and eye physicians will give their services without charge when they understand the serious need.

Routine examinations of the eyes are also valuable in building up reliable knowledge of the prevalence of the various causes of blindness. When records are more complete so that proper classifications may be made, authentic data may be assembled. Organizations for the blind may well contribute to this knowledge by keeping accurate records, the beginning of which must be the routine eye examination.

What Are the Causes of Blindness?—Among the direct causes of blindness, presented from the point of view of the worker with the blind, the following may be mentioned:

Cataract.—In an analysis of 360 records of the blind, cataracts (congenital, diabetic, and other types) were reported as the cause of blindness in one-third of the cases. Since these figures were compiled in a state where routine examinations of the eyes were not the rule, the percentage may be high, but it indicates that if examinations had been made when patients came under observation, undoubtedly operation would have saved the sight of some.

Statistics from the United States residential and day schools for the blind show that 14.8 per cent of the 5,286 pupils in these schools are blind as a result of congenital cataract. Newmayer[3] records the interesting case of a family of five children, three of whom had congenital cataracts of both eyes. Following operation, the vision of the two older ones, aged 12 and 14 years, was 15/100 in each eye. The youngest child, three years old, has not yet been operated upon. Many cataracts result from injuries, either simple blows on the eyes or penetrating injuries, and naturally many of the cataracts of this type are preventable.

Incipient senile cataract develops in people past middle age, but it is probable that age is not the most important factor in the production of the cataract. We are beginning to realize that the patient's general condition plays an important part in the cause of cataract.

For a long time we have been impressed with the close relation that exists between chronic infection and cataract. Often one sees a slowly developing cataract associated with a chronic sinus infection. We are being forced to the conclusion that the majority of cataracts whether in children or in adults, have a cause, even if we are unable today to find it. In the present state of our knowledge, we must make every effort to find that cause, whether it be in the nose or throat, sinuses, teeth, intestinal tract, blood (example: diabetic cataract), glandular system, or due to a congenital or hereditary defect. Several years ago, in a certain hospital in a large city, every patient with a cataract was operated upon as soon as possible. No thorough general examination of the patient was made. At present, in most hospitals, careful general studies, including Wassermann tests, urinalysis, and blood chemistry, are usually made before operation is advised.

Finally, a brief word on the treatment of cataract—once the cataract has become established, it cannot be dissolved. It consists of degenerated lens fibers enclosed by the lens capsule. In the incipient stage, improvement in visual acuity may occur under appropriate general treatment. This may not be due entirely to a decrease in the extent of the cataract, for once the fibers are degenerated they will never return to normal, and operation is the only cure.

Organizations for the blind can aid in preventing cataracts by disseminating information in regard to the hereditary nature of certain cataracts and the possible danger of transmitting the defect; by aiding in safety campaigns in industry and by stressing the danger of playing with pointed instruments and air rifles; and by assisting public health organizations in raising living standards and promoting measures to improve health.

Ophthalmia Neonatorum (Babies' Sore Eyes or Gonorrheal Conjunctivitis).—While all inflammation of the eyes in the newborn is not due to gonococci, the gonorrheal variety leads to the most serious consequences. Fortunately, the incidence of ophthalmia neonatorum has been greatly reduced, as announced at the recently celebrated twenty-fifth anniversary of the National Society for the Prevention of Blindness. Twenty-five years ago 26.5 per cent of the pupils entering schools for the blind owed their

misfortune to babies' sore eyes. Seven years later the percentage had been reduced to 15.1. Now it is 7. This is the result of the adoption of laws, in most states, requiring doctors, nurses, or others in attendance to put prophylactic drops in the eyes of babies at birth. The complete eradication of this source of blindness is regarded as scientifically possible, and laws requiring the use of a prophylactic should be enacted in every state. The co-operation of associations for the blind can aid materially in obtaining legislation requiring the use of a prophylactic.

Syphilis.—Conservative estimates tabulate syphilis as the cause of at least 15 per cent of total blindness in several occidental countries. For every case of total blindness traceable to syphilis, several times as many cases of serious impairment of vision are due to this cause.

Patients may be divided into two classes: those with acquired syphilis and those with congenital syphilis. In those who have acquired syphilis, ocular signs often appear long after the initial symptoms of the disease have become manifest. Hard chancre (the primary lesion) of the eyelids is very rare but the mere fact that it occurs teaches us that the disease may be spread through kissing. Many patients, treated for a time and seeing no signs of skin disfigurement or external evidence prompting further care, fail to follow medical advice. The tissues of the eye like the tissues of the spinal cord and central nervous system, are most susceptible to infection and suffer from the accumulation of toxic substances, which may not be easily recognized for 20 to 30 years after the onset of the infection.

Among the eye involvements which may be due directly or indirectly to syphilis are interstitial keratitis, iritis, choroiditis, retinitis, optic atrophy, and a number of other serious eye conditions. No structure of the eye is exempt.

When the seeing coat of the eyeball (the retina) is affected by syphilis, the blood vessel coat (the choroid) is likewise involved and chorioretinitis follows. In many cases syphilitic retinitis takes on a form which simulates retinitis pigmentosa (a progressive disease of the retina with pigmentation, the cause of which is unknown). We then see areas of pigment scattered over the entire back of the eye. These patients also have night blindness.

In these cases salvarsan and mercury may aid, whereas the cases of true retinitis pigmentosa are not benefited by these drugs.

Early recognition and appreciation of the importance of immediate and continued treatment, perhaps extending over several years, will tend to reduce loss of vision as well as the many other physical disasters consequent upon syphilis.

The ravages of congenital syphilis are so serious and can so largely be avoided by known preventive measures that we are challenged to fight for future generations of innocent children. Holloway[4] estimates that 75 per cent of congenitally syphilitic persons sooner or later show distinct ocular evidences of syphilis. The child may be born with normal sight but, with this disease congenitally present, vision may be slightly more impaired each year during childhood and youth. If proper precautions are not taken, such eye conditions as interstitial keratitis, one of the common causes of blindness, may result. It is, therefore, important that children in whom there is any reason to suspect congenital syphilis should be kept under careful supervision and that every precaution should be taken to control the disease. The congenitally syphilitic child may have certain characteristics which are easily recognized, such as the stature, shape of the head, formation of the teeth, etc., but in many instances no cranial or facial stigmas are evident.

Physicians generally agree that properly administered treatment of the expectant mother, commenced as soon as possible after the beginning of pregnancy and, in any case, not later than the fourth month, will almost certainly free the child born of such a mother from infection.

Parents whose blindness is due to syphilis, either congenital or acquired, should take every precaution to insure against blindness in their children from this cause. Agencies for the blind should seize every opportunity to put the correct information into their hands and to assist them to secure the proper treatment and care. By disseminating information in regard to blindness caused by syphilis and by co-operating with agencies dealing with the prevention of syphilis much unnecessary blindness may be prevented.

Hereditary Blindness.—Workers with the blind are often called upon for an opinion as to the danger of blindness in the children

of blind parents. It is therefore important for them to have a correct understanding of such questions and to use their influence in the right direction when the occasion arises. There is much misinformation current regarding the possibility of inherited blindness. But first it would be well to explain what hereditary blindness is.

Truly hereditary blindness is that which is transmitted through the germ plasm from parent to child. It is an inherent part of the child's make-up, present from the moment of conception, and manifests itself either in blindness from birth or in a weakness or defect which ultimately produces blindness. It is transmissible in the same way that the color of the eyes and the shape of the features are transmissible. Fortunately, cases of blindness which are truly hereditary are believed to be comparatively rare; but, unfortunately, little is known about the rules of their transmission. It is safe to say, however, that parents, who are themselves blind from hereditary causes or who have, in either family, cases of hereditary blindness, should not risk having children.

In the present state of our knowledge concerning the causes of blindness, it is difficult to differentiate hereditary from congenital causes. Statistics (1930–31) from residential and day school classes for the blind in the United States show that 28.6 per cent of all blindness is due to congenital and hereditary causes.

In a study of the causes of blindness among pupils in the Pennsylvania Institution for the Instruction of the Blind (1932–33), it was found that of 265 pupils, 120 (45 per cent) were blind from congenital and hereditary causes.

Nettleship[5] traced senile and juvenile cataract through 167 families, three to six generations being affected; and studied 238 cases of hereditary cataract. In one family, 30 members in four generations showed the defect.

Loeb[6] reported a family in which every member for five generations was affected with cataract. He also records cases of six families headed by blind parents in which 17 out of 31 children were blind.

Howe[7] found eight cases of glaucoma in one family. After several years this number had increased to fourteen. Forty years ago two young people, congenitally blind, were married. A few years ago their blind progeny numbered 17.[8]

Fortunately, many so-called hereditary eye defects are really congenital and due to birth injuries; but many thousands of cases are truly hereditary, and organizations for the blind can aid by disseminating information regarding these defects and by co-operating with agencies interested in hereditary and congenital diseases.

Trachoma.—While the United States has for many years refused admission to immigrants showing symptoms of trachoma, there are thousands of citizens and Indian wards afflicted with this disease, which often results in loss of sight and in economic failure.

Preventive measures are handicapped by lack of knowledge as to the exact cause of the disease, but all public health measures directed against over-crowding and those which improve health and living conditions are of value. All institutions for the blind should be careful to exclude applicants who have trachoma until an eye physician says the disease is not transmissible.

Glaucoma.—This disease causes much of the blindness of middle age and later life. Jackson[9] estimates that 12 per cent of all cases of hopeless blindness are caused by glaucoma. There is also the type known as congenital glaucoma, which occurs in infants. This is called "ox-eye" or buphthalmos. It is probably due to poor development or blocking of the outlet channels, and, occasionally, to a prenatal inflammation.

Glaucoma is now being treated as "a sick eye in a sick body" and, while no definite cause has been determined, certain investigators are beginning to believe that general disorders and chronic infections may play an important rôle. Relief from symptoms and arrest of the disease, but not a cure, are all that may be expected from treatment. Often blindness and intense continual pain can be avoided.

Agencies for the blind can aid by disseminating information in regard to the great necessity for the continued observation and treatment of patients who have glaucoma, by aiding the promotion of measures to improve the general health, and by urging the periodical examination of the eyes, especially in middle-aged, or older persons.

Tuberculosis.—Tuberculosis of the eye causes a large amount of blindness. It may appear in children in the form of disseminated choroiditis, that is, scattered areas of inflammation affecting the

blood vessel and seeing coats of the eye. It is estimated that 25 per cent of the diseases affecting the blood vessel coat of the eyeball which may result in blindness are caused by tuberculosis.

Another type of tuberculosis affects the central part of the back of the eye and may destroy central vision. Improving living conditions and diet, and seeing that the patient receives constant supervision and treatment, may effect improvement if the disease is not too far advanced. Certain authorities place great reliance in tuberculin.

Prevention is and should be under the guidance of agencies for the prevention and cure of tuberculosis and those interested in preventing blindness from this cause can be of greatest service by cooperating with these agencies.

Accidents.—The development of inventions and the resulting hazards of industrial life have brought about a large increase in the blind population. Professor Best's statement[10] that "external injury constitutes the most important cause of blindness through the greater part of life" is supported by the estimate[11] that, in the United States, approximately 15 per cent of those blind are so as a result of industrial accidents. It is evident that a still greater number have vision so impaired by injury as to handicap them for life.

In this class of blindness, especially, one finds evidence of the tremendous economic waste resulting from loss of efficiency and the actual financial cost of compensation. To mention an example: over a period of eight years, under the Workmen's Compensation Act in the state of Pennsylvania, compensation for loss of eyes constituted more than 40 per cent of the amount awarded for permanent injuries. In other words, of a $15,332,220 total, $6,201,762 was awarded for eye accidents, a greater sum than the combined compensation for loss of legs, arms, and feet and from miscellaneous injuries.[12]

The Pullman Company, one of the largest industrial organizations in the United States, reports the saving from serious injury or destruction of sight of approximately 1,000 men since the adoption of regulations demanding the use of protective goggles. Another company records a decrease in accident cost from $16,500 to $200 a year. Still another reports during a three-year period a

steady reduction of eye injuries from 103 to four as a consequence of the use of protective devices.

Blindness from industrial accidents may be reduced through the co-operation of the employer and the education of the superintendents and workers in means of preventing and caring for accidents.

Legislation, compensation for injuries and other governmental regulations undoubtedly will continue to play a most important part in forcing industry to reduce accidents of all sorts, and this will be advanced by the modern tendency to make industry responsible for loss of life and for permanent injury. The contribution of volunteer safety movements in the industrial field is also well recognized.

Automobile accidents, so frequently accompanied by flying fragments of glass, account for numerous eye injuries. It is gratifying to know that recently three states, New York, Nebraska and Pennsylvania, have passed laws providing that shatter-proof glass be installed in all automobiles. Fourth of July accidents are frequent preventable causes of blindness.

Workers with the blind can aid in preventing blindness from injuries by helping to disseminate information in regard to the frequency, causes and methods of preventing eye injuries and by co-operating with agencies dealing with the prevention of blindness from these causes.

Statistics of Causes of Blindness.—It is unfortunately true that there are in this country, and, practically speaking, in the world, no reliable data as to the prevalence of the various causes of blindness. Such studies as have been made include only limited areas, and, because there has been little uniformity in classifying the data, it is impossible to combine them into statistics representative of larger groups. Consequently, we have no authentic statistical data on which to base campaigns for the prevention of blindness, nor can we measure with any accuracy the progress made in prevention. Organizations for the blind are in a better position than any other agency to record and assemble these data, and may well feel an obligation to make this contribution to our knowledge of blindness and our activities for its prevention. Fortunately, the time and expense involved in assembling such data are very small. The routine eye examination by a competent ophthalmologist,

which we have already discussed as being an essential preliminary to the social treatment of the case, will afford the necessary facts; and the compiling of summaries is the smallest part of the task. I would therefore urge every agency for the blind to undertake to record as completely as possible the causes of blindness among its clients. The Committee on Statistics of the Blind, sponsored jointly by the National Society for the Prevention of Blindness and the American Foundation for the Blind, will be glad to give assistance in the compilation of such data.

The Interpretation and Dissemination of Information to the Public

Prevention of blindness depends primarily upon the education of the public as to the possible causes of blindness and the means which should be used to prevent it. This education may take the form of talks before women's clubs, Lions' Clubs, and other public bodies, talks to students in schools and colleges, newspaper articles, exhibits at county fairs, news letters sent out periodically, and other means of getting information into the hands of the lay public. It is gratifying to note, as I have stated earlier in this paper, that, through the use of such means, the incidence of ophthalmia neonatorum has been greatly reduced during the past twenty-five years. Since ophthalmia neonatorum may be prevented by the simple and safe method of introducing a solution of nitrate of silver into the eyes of the newborn child, there should really be no cases of blindness from this cause, and we must carry on until this entirely unnecessary and preventable disease shall have been completely eliminated.

Accidents are another cause of blindness concerning which the education of the public is essential. Although no figures are available, there is reason to believe that blindness from industrial accidents has been increasing. Safety education campaigns, particularly among factory workmen, will tend to decrease this. Blindness from Fourth of July accidents is also unnecessary and, because of safety education, is yielding to better understanding on the part of parents and children. Laws regulating the sale of fireworks have been enacted in several states, but they can be enforced only through the whole-hearted support of the public.

The public should be educated to consult a competent eye

physician when eye symptoms develop, for in this way many eye conditions, such as glaucoma (hardening of the eyeball), trachoma, and tuberculosis may be discovered, treated and controlled before sight is lost. In such cases time is often the most important factor.

It is essential also for the public to know the relation between general diseases and diseases of the eye, and to realize that many eye conditions have a background of deranged bodily function or disease that may be discovered by an eye physician.

Co-operation with Other Agencies

Co-operation with Eye Clinics.—In some institutions for the blind, every patient, before being accepted, is examined in an eye clinic, and the medical and surgical treatment indicated is carried out. One institution (Lighthouse Eye Clinic of the New York Association for the Blind) has developed its own eye clinic. In the last two and one-half years (November 1, 1930, to June 22, 1933) 2,313 patients have been examined. In this clinic, social service and follow-up work have been stressed, because it has long been apparent that probably the greatest field for preventive ophthalmology is in the eye clinic,[13, 14] and that clinics without proper social service work fail lamentably in preventing blindness.

If proper social service and follow-up work is carried out until treatment is completed on all patients with eye diseases which may result in blindness, much blindness can be prevented. In the Lighthouse Eye Clinic, 353 home visits were made and, 3,586 follow-up letters were written between November 1, 1930, and June 22, 1933.

Even though all organizations for the blind cannot have their own eye clinics in connection with their social service work, by aiding in the organization of follow-up work for their cases and by stressing follow-up work in other clinics in which they may have influence, they will do splendid work in preventing unnecessary blindness.

The preschool clinic in which children are routinely examined before they are old enough to attend school is most valuable. In these clinics early tendencies to eye diseases which might result in blindness are diagnosed and treated.

Co-operation with Public Health Agencies.—There should be the closest co-operation between the agencies for the blind and the

public health agencies in the prevention of communicable disease which may lead to blindness. Ophthalmia neonatorum comes under this head, as do measles, trachoma, smallpox, scarlet fever, meningitis, syphilis, and other diseases. Great progress has been made during the past twenty-five years in the prevention of communicable disease, but much still remains to be done.

It will be found that the public health nurse is one of the most effective agents in this type of prevention, and many ways will be found in which her active co-operation will prove most valuable. In this connection, it should also be pointed out that the public health nurse may be very useful in locating cases of blindness or prospective blindness, particularly in isolated communities. It would be well for the worker with the blind to spend some time and effort in interesting the public health nurse and in adding to her store of information about blindness and the possibilities of preventing blindness.

Promotion of Sight-Saving Activities.[15]—You are familiar with those cases of defective vision in which unwise use of the eyes will destroy whatever sight remains. This is particularly important in children, since the ordinary process of obtaining an education calls for constant use of the eyes. One of the most important activities in prevention of blindness is the promotion of sight-saving classes—that is, classes in the public schools where, through the use of large print, verbal instruction, exceptionally good lighting, suitable desks and special writing appliances (soft black pencils and unglazed paper), a child may receive an education without undue eyestrain.

The agency for the blind should interest itself in this type of prevention work, either in co-operation with other agencies, or, if necessary, as the leading spirit in the movement. Many states provide by law for the establishment of such special classes in the public schools, and all that is needed to bring them into being are energy and determination. In other states such laws do not exist and the agency for the blind should make every effort to see that proper provision is made for these pupils in need of sight conservation.

Should an Agency for the Blind Have a Prevention Campaign?

Some may feel that an agency for the blind is concerned only with actual blindness and should not extend its interest and duties

to include prevention work. Associations for the blind, when they sponsor any work for the prevention of blindness, carry authority which demands and receives attention, and their active co-operation in all preventive work is highly desirable. I fully appreciate that they have their own special work and problems and that most of the active work for the prevention of blindness should be carried on by organizations developed for this purpose. In many cases it is true that prevention work is adequately taken care of by other agencies, and that the agency for the blind should co-operate with them rather than institute activities of its own. In many communities, however, this is not true, and in view of the social and economic importance of preventing blindness as well as the value of increased human happiness it is essential that some agency should undertake it. In such cases it would seem short-sighted for agencies for the blind not to organize an active campaign for the prevention of blindness through co-operation with the National Society for the Prevention of Blindness.

Conclusions

I hope the suggestions presented have made it evident that an organization for the blind can aid materially in the prevention of blindness, and that this preventive work is one of its most important functions.

Much unnecessary blindness may be prevented if organizations for the blind will take active part in the following:

1. Having every client thoroughly examined by an ophthalmologist;
2. Securing surgical or medical treatment for all patients requiring it;
3. Establishing eye clinics and preschool clinics with social service and follow-up work in association with their work or aiding in the organization of follow-up work in other clinics;
4. Educating the public by means of lectures, pamphlets, posters, etc., in regard to measures for the prevention of blindness;
5. Co-operating with sight-saving classes or aiding in the establishment of classes;
6. Obtaining the passage of laws to improve social conditions and to require the use of certain preventive measures and safety devices;

7. Co-operating with national and local organizations for the prevention of blindness, and public health and other agencies which deal with certain phases of the prevention of blindness problem.

Organizations for the blind and those interested in working with the blind will be heard with eagerness when they speak on the subject of prevention of blindness. Certain of the statistics presented in this paper show that unfortunately much is yet to be accomplished in preventing blindness.

I hope that interest in this subject has been stimulated by this discussion and a desire for active co-operation in this work has been aroused. If this result has been attained we will have aided in bringing light and added happiness to many and, if our highest ambition is realized, we may ultimately prevent blindness in all but that 25 or 30 per cent of people in whom it was inevitable.

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A Plea for More Sight-Saving Classes

A. L. Adams, M.D.

Introduction by Audrey M. Hayden

CAREFUL examination of the eyes of applicants for admission to schools for the blind will locate some who belong, more suitably, in sight-saving classes

Introduction

Dr. Adams' paper was read in May before the Eye Section of the Illinois Medical Society. His interest in the subject has been an outgrowth of his work as attending ophthalmologist at the School for the Blind in Jacksonville. He has felt, for some time, that many children were admitted to that institution who, seemingly, had too much vision to be educated through the medium of their finger tips. This, he felt, was unfair to the Institution but more unfair to the children for whom normal pedagogical methods were possible.

In November of 1931 the Commissioner of Public Welfare invited Dr. Harry S. Gradle, Dr. Sanford R. Gifford and Dr. Richard Gamble, all of Chicago, to make an examination of some 48 cases which Dr. Adams had selected. The showing on these cases led them to believe that a more thorough examination would be valuable. In the spring of 1933, therefore, the same three ophthalmologists spent an entire day at the School for the Blind, and made an examination of the 238 children enrolled at that time. They made the following recommendations:

1. That a model sight-saving division be established to which should be admitted only those children whose homes are not within available distance of towns in which sight-saving classes are already operating.

2. That the blind division and the sight-saving division should live together but should have entirely separate educations.
3. That the requirements for admission to the School for the Blind should be:

   Blind Division—vision, with correction, of less than 20/200.

   Sight-Saving Division—vision between 20/70 and 20/200, after refraction.

   For admission to the School there should be a certificate from a doctor licensed to practice in the state of Illinois and registered in the Eye Section of the Illinois State Medical Society, stating the diagnosis and condition of the eyes, and vision with and without glasses.
4. That the attending ophthalmologist at the School for the Blind should be authorized to refuse admission to children whose vision is too good for the above requirements. This implies examination upon admission.
5. That a systematic examination should be made every three years by members of the Illinois Eye and Ear Infirmary staff.
6. That the attending ophthalmologist at the School for the Blind should be authorized to remedy defects as occasion arises.
7. That the School should be equipped with a modern examining and operating room.
8. That the remedies herein suggested should be instituted during this next summer.

As a result of this splendid piece of work, a general reorganization program has been embarked upon. Mr. Woolston, the superintendent of the Illinois School for the Blind, had $3,300 released from the 1932–33 appropriations for the building and equipping of an operating room and two model sight-saving classes. The Illinois Society for Prevention of Blindness, acting in an advisory capacity, furnished the standards for the classes and arranged for the training of two teachers at the University of Chicago. The recommendations which the doctors had made for refractions were gone over carefully and the Society arranged for the refraction of those children living in communities where good ophthalmic advice is available.

The whole reorganization plan has been of intense interest to the Society for the Prevention of Blindness. In our surveys of the eyesight of school children we often find isolated cases which are not covered by our legislative program for special education in the public schools. The two sight-saving classes at Jacksonville will prove very valuable to us for such cases. We feel, however, that no partially sighted child should be sent to Jacksonville who can possibly be taken care of in his own community. Each sight-saving class pupil at Jacksonville will cost the state about $700 more than if the child were taken care of at home and so for financial reasons, not to mention social reasons, these classes should be used very carefully.

The value of Dr. Adams' paper is that it brings to the attention of the ophthalmologists of this state a condition which they may help to remedy and we feel sure, by the interest that it aroused, that he will have a more intelligent backing from his profession in the future.

What Is Blindness?

When it is considered how long the standard of normal vision has been established, is it not strange that there should not be a more definite idea of what really constitutes blindness? It has been described as "an incurable total loss of sight." The popular definition of it however is "that condition in which the sight is so diminished that any occupation requiring the use of the eyes is impracticable."

The Workmen's Compensation Act, the various Blind Pension Acts, and the laws governing the education of the blind call for an exact definition of blindness. In deciding whether or not a person is blind, it is often necessary to fall back on legal interpretation, to find out the intent of the law.

Educational blindness is present when the person cannot, because of loss of vision, receive an education in the public schools. Efforts have been made to establish a definite limit in visual efficiency. Some authorities would place this at 20/200, or one-tenth vision. Others would place it at 20/70.

Mr. Lewis H. Carris, managing director of the National Society for Prevention of Blindness, says in one of his reports;

"In general, it is considered expedient to call a person blind who has only one-tenth of visual acuity. But what about those of us who do not know what one-tenth of vision means, and how to measure sight? Then again, it is not sufficient to consider only the degree of vision; the extent of the visual field is an element of highest importance, and there are other factors to consider as well. It is necessary in censuses that each doubtful case be considered by a specialist with his complicated equipment in order to control these various standards."

Mr. Carris quotes the following definition of blindness from *Handbook on the Welfare of the Blind in England and Wales.*

"The Ministry of Health in circulars 681 and 780, explained the principles which they adopt in deciding whether a person is too blind to perform work for which eyesight is essential. Briefly, only visual factors can be taken into account and other bodily or mental infirmities should be disregarded.

"Where the acuity of vision (refractive error being corrected) is below 1/20 of normal (3/60 Snellen), the person may be usually regarded as blind. Where the acuity is better than 6/60 or 20/180 (Snellen), the presumption is that the person is not blind unless there are such counterbalancing visual conditions as great contraction of the field of vision, marked by nystagmus, etc. The test to be applied is not whether a person is unable to pursue his ordinary occupation, or any particular occupation, but whether he is too blind to perform work for which eyesight is essential."

In discussing the certification of blindness, N. Bishop Harman, London (*The Medical Officer*, December 24, 1932), who has done much to prevent blindness and assist the blind, mentions three cases that illustrate the practical difficulties encountered:

A woman with chronic glaucoma has vision of 6/9 but a field limited to 5° from the fixation point; she can read when she can find the place, but cannot walk without being led, and cannot see to shake hands with a visitor.

A country parson with central senile choroiditis and no central vision, but a good peripheral field, has complete freedom of movement, and knows his prayer book; and so goes about and performs all his parish duties.

A volunteer officer with retinitis pigmentosa had full vision and good fields by daylight; but had to be led when marching at night.

Organic blindness due to ocular lesions can be recognized or ex-

cluded with certainty. But psychic blindness, as illustrated by shell shock and hysteria, may puzzle or defeat the most experienced diagnostician. Seeing is done, not with the eye, but with the brain. The great mass of cerebral convolutions that have developed with accurate macular vision explains the enormous influence of vision upon all our consciousness, and suggests the possible influences of cerebral function upon vision.

In schools for the blind it is recognized that a large proportion of children have some sight. Harman says "Where there is no full provision for children with defective sight, and no choice between elementary school and the Blind School, it is inevitable that borderline cases will be drafted into the Blind Schools. The certification of blindness in children can rarely be final. It should always be recognized as provisional and subject to revision. No sharp and permanent lines can be drawn between blind and seeing, either by a formal definition, or a scientific test; and it is not desirable that there should be such a discrimination."

The majority of those called blind can find satisfaction and usefulness in the exercise of the remnant of vision they do possess. The most that can be done for them is to help them keep and use what sight they have. When it becomes necessary to discriminate between the seeing and the blind, for purposes of education or care, each case should be carefully studied for itself—by a person trained and experienced for such examination—both as to ocular conditions present and as to other abilities and surroundings.

Responsibility for Admission to Schools for the Blind

As examiner of the eyes of those making application for entrance to the Illinois School for the Blind, I have been deeply interested in this problem and feel that much can be accomplished by a consideration of these questions presented to you today. The decision as to the advisability of having a child with defective vision continue with his handicap in the public schools or to send him to the School for the Blind is often not easily made. It should depend not only on the actual eye conditions present, but on the probable outcome. We know that the vision in some children will in all probability improve, while in others, even though the vision is fairly good, we know it will inevitably become worse. The field of vision and light sense must be carefully considered.

There should always be an opportunity for a revision of opinion. Should the vision improve and the eyes be healthy, the student should return to a sight-saving class or to the public school.

As the children come from all parts of the state it is important that competent advice should be had as near their homes as possible before application is made to enter the School for the Blind. By this examination the amount of vision present and the necessity for treatment or operation would be determined.

I would recommend to the Board of Public Welfare the appointment of official examiners in the larger cities of the state—members of the Eye Section of the Illinois State Medical Society—who should make the preliminary examination of the eyes of those desiring to make application for admission to the School for the Blind. The final decision should be made by the ophthalmologist in charge at the School, after sufficient time for examination and observation.

The ophthalmologist of the School for the Blind or of sight-saving classes should be given the findings of these examinations by the examiners of the blind before an application is made for their admission. A moderate fee should be paid to these examiners, by the state, for this service.

From the larger cities most of the applicants have had competent advice from physicians and social service agencies, but often those coming from the country or small towns have the application made out by a neighbor, visiting nurse or an optometrist with the question as to the cause of blindness answered by "fever"; "sore eyes"; "had a fall"; or "don't know"; and the query as to the amount of vision is answered by "poor"; "can see large print"; "can see to get about."

The physician near home has the opportunity of getting more or less history from the parent or guardian, which is of great importance in determining the cause of blindness. When we find both eyes shrunken to the size of small buttons or even enucleated, and no history attached, the "Undetermined" in the records become understandable.

Illinois Law for Education of the Blind or Deaf

The basic law providing for the education of blind or deaf children in Illinois is as follows:

Education of Deaf and Blind Children

An Act to make provision for the education of deaf and blind children. (Filed June 28, 1917. L. 1917, P 734)

683. **Duty of Parents or Guardian.** Section 1. Be it enacted by the People of the State of Illinois, represented in the General Assembly; It shall be the duty of every parent, guardian or other person, having the control or charge of any child in this state between the ages of eight and eighteen years, who is deaf or blind, or whose hearing or vision is so defective as to make it impracticable to have such child educated in the ordinary public schools of this state, to send such child to some school under private or public supervision, where special provision is made for the education of the deaf or blind; if there be such a school within the county where such child resides, then such child may be sent thereto, but if not, then to some other convenient school of that character, within the state or to the Illinois School for the Deaf, or to the Illinois School for the Blind, at Jacksonville. Provided, that nothing herein shall require a child not physically or mentally competent to be educated, to be so sent.

(Smith-Hurd, 1929–Chapter 122, Article 682, Section 1, Page 2727)

The opportunity for difference of opinion in the interpretation of this law can be easily seen. Given a child with even slightly defective vision, with an active mind and full of mischief, who fails to keep pace with his fellow students, a teacher overworked with forty or fifty pupils, a visiting nurse, and the stage is set for another applicant for the School for the Blind. On the other hand it is not at all unusual to have the field workers find a blind child whose parents had never heard of the School for the Blind.

During the past year among 250 pupils in the School for the Blind, 109 either had no vision or light perception only. Seventy-three could count only fingers. Fifty-five had vision with correcting glasses of 20/70 to 20/200. Thirteen had vision of 20/70 or better.

Of those having vision better than 20/70, three had high myopia. One had vision of 20/30, contracted fields, and night blindness. One had vision of 20/45 with coloboma choroid and nystagmus. Several who had congenital cataract, had vision of about 20/45

with correction. One with vision of 20/60, had macular changes. Five had vision of 20/70 with the better eye only.

While 55 of these 250 pupils have a vision between 20/70 and 20/200 and would seem to be eligible for sight-saving classes, we find that a large majority of them are from small cities and country districts where no such classes are available. The state requires these children to be sent to school between the ages of eight and eighteen and, at present, except in the larger cities, the School for the Blind is the only available place for them to attend school.

The Sight-Saving Class for Partially-Seeing Children

A method for the education of these children with partial sight was first developed, in the United States, by Mr. Edward E. Allen, a director of a school for the blind in Massachusetts. This school opened in April, 1913.

The plan consists in using the available vision under the most favorable circumstances. The teacher of these sight-saving classes should have special training for her work, after from two to five years experience in teaching children with normal vision. This special training is available at the summer courses at Columbia University, the Universities of Chicago and of Cincinnati and other universities. An intensive training for six weeks will enable a teacher to conduct a class.

Mr. Edward T. Myer in his survey of sight-saving classes in the public schools of the United States gives sixteen as the largest number possible to be included in a sight-saving class. These classes have been maintained in cities of only 3,600 school enrollment. The per capita cost at the Illinois School for the Blind last year was $862.41. The average cost per pupil enrolled in the public schools of Illinois for 1931–32 was $95.52. About four and one-half per cent of the pupils in sight-saving classes in the United States are returned to the regular classes in the public school after from one to two years' time.

At the present time there are 44 sight-saving classes in Illinois. Thirty-three are in Chicago, 2 in Joliet, 2 in Rockford, 2 in Rock Island, 1 in each of the following cities; Aurora, Elgin, Evanston, Springfield and Villa Park. There are usually twelve to fourteen children in each class. Villa Park, with a population of 6,220, is

the smallest city in Illinois in which a sight-saving class is established and to it come children from all over DuPage County.

Where the vision of an applicant in the better eye is found to be 20/70 or better, and there is no active pathology endangering vision present, the applicant should always be referred to a sight-saving class, provided one is in operation in the county from which he comes.

By the law passed in 1929 the state will provide $250 per annum toward the maintenance of one pupil in a sight-saving class. The law also provides that teachers shall be especially trained and the classes shall have state supervision.

Recommended Basis for Admission of Pupils to Sight-Saving Classes

No standard for admission to sight-saving classes has as yet been adopted by the Illinois Society for the Prevention of Blindness. In the meantime, we give herewith the standards proposed by a special committee approved by the National Society for the Prevention of Blindness in July, 1928.

1. Children having a visual acuity of 20/70 or less in the better eye after proper refraction are potential candidates for a sight-saving class. In addition, the following are recommended:

(a) Children in elementary schools having four or more diopters of myopia.

(b) Inactive, subsiding (or regressive) cases, such as interstitial or phlyctenular keratitis, optic neuritis, trachoma, etc., in which some irritation may be present—provided the approval of the attending physician is given.

2. All cases must be considered individually.

3. Any child who, in the opinion of the ophthalmologist would benefit by assignment to a sight-saving class, subject to suggestion for treatment and training by such ophthalmologist, and the acceptance of the educational authorities having charge of such classes.

4. It is assumed that all children assigned to sight-saving classes have average normal mentality.

Winifred Hathaway, associate director of the National Society for Prevention of Blindness says:

"The experiences of the twentieth century would seem to indicate that the sight-saving class is the best method yet developed for educating partially-seeing children, since it approximates as nearly as possible the education of the normally-seeing. It would seem almost unnecessary to have to justify the cost of the education of any child who is educable; humanitarianism alone would seem a sufficient justification. Yet it must be remembered that the State is responsible to the taxpayers for the use of public moneys; in consequence, the State must look upon expenditures for education as an investment that will pay justifiable dividends. The object of educating partially-seeing children is the same as in the education of any group; namely to prevent illiteracy and to develop the innate powers of the individual so that he will become an asset of the greatest possible value to himself and to the State.

"To give a partially-seeing child an even chance with the normally seeing, it is necessary to provide him with the opportunity to overcome his handicap. In order to do this, such facilities must be at his command as will permit him to develop along the line of his greatest strength, while his weakness, in so far as this is possible, is prevented from becoming worse."

The responsibility is largely ours in making the decision as to whether this child shall go to the School for the Blind or, if sufficient vision is present and the eyes in fair condition, to the public school or to a sight-saving class. If no sight-saving class is available to you, what can be done toward having one?

Schools for the blind are doing a wonderful work and prove the great advance in civilization in the last century. The development of sight-saving classes is the next forward step.

If by our combined efforts we can further a plan by means of which certain handicapped individuals may acquire an education and select a vocation as nearly along normal lines as possible, it will be well worth while.

Editors' Note.—This paper is an extract of an article printed in the Illinois Medical Journal, August, 1933, with a specially prepared introduction by Miss Hayden, of the Illinois Society for the Prevention of Blindness.

Eye Examinations in a Zinc Ore Industry*

R. H. Seip

EXAMINATION of the eyes of 1,265 employees in a zinc ore plant disclosed that more than 17 per cent suffered from seriously defective vision

THE work in which we are engaged is the mining and milling of zinc ore.† The class of labor includes all nationalities: Americans, Irish, Polish, Lithuanians, Russians, Mexicans, Chileans, and so on. In 1931, the first of a series of periodic physical examinations of all employees was conducted by the company surgeon. The total number of employees examined was 1,265. The statistics of this survey showed that 17.1 per cent of the total number examined had some considerable degree of defective vision. Vision was not recorded as defective unless the defect was greater than 20/40 in one or both eyes. A large percentage of those with defective vision had never had any correction. Others had had correction, but did not have their glasses with them at the time of the physical examination. Others who had had correction indicated that a change in correction was needed.

One of the purposes of this physical survey was to extend helpful advice to such employees whose physical condition could be improved. To carry out this purpose in part, and to give advice of a helpful nature along some specific line involving a good percentage of employees, the matter of defective vision was given first consideration.

The first step in this direction was to have the visual acuity tests, which were made by the company surgeon, checked by a competent medical eye specialist. Two hundred employees, or

* Presented at the Greater New York Safety Conference, New York City, during the session on "The Eye."

† The New Jersey Zinc Company.

about the 17.1 per cent that I mentioned above, were included in this check survey. The results in each individual case were scrutinized by the specialist to determine whether a complete ophthalmological examination was warranted. It was found that such an examination was indicated as advisable in 118 of the 200 cases. Each of the 200 employees examined in the check survey was notified, in a letter from the superintendent, of the findings of his particular examination, including a report on the nature of the defect in each eye. These defects were listed as none, slight, moderate, or serious, rather than by the use of the visual acuity fractions.

Employees whose visual tests indicated the advisability of further examination with a view to correction were advised to have such examination made. No recommendation was made as to whom they should consult for such examination, except that they were urged to consult a competent medical specialist.

To enhance the probability of having such examination made by the employee, arrangements were made with an eminent medical eye specialist whereby the examinations would be made at the plant. This was done to eliminate the loss of time by hourly employees that would ensue if it were necessary for them to go out of town for examination, also to eliminate the cost of transportation and to obtain reasonable minimum cost for a competent specialist's services.

Through the offices of the specialist, a competent dispensing optician agreed to accompany him to the plant to make the necessary measurements for frames, to display the various types of frames, and return to the plant to fit the glasses to the individual.

Information on these tentative arrangements was conveyed to the employees verbally in order to avoid any appearance of pressure or commercialism. Subsequently, many requests for the services of the specialist and optician were made to the Safety Division of the company, which division was instrumental in conducting all examinations. A schedule of appointments was prepared and each person was notified by letter of the date and hour of his appointment.

The company provided the examination room, including a special dark room and special lighting. An assistant was also fur-

nished by the Franklin Hospital. All records were made by a representative of the Safety Division. The schedule provided for 24 examinations in an eight-hour period, and it was found possible to maintain this schedule. Each individual paid his own bill to the doctor and optician, and no finances were handled by the company.

Applications for examinations continued to come in and included many requests from members of the families of employees. The service, therefore, was extended to include members of employees' families and, later, to other residents of the two towns in which the company conducts operations. This last extension, however, was not widely advertised and no effort was made to get business. The primary purpose was to extend a definite service to employees.

Of the 118 employees advised to have complete examinations, 87 accepted this advice. Among the remaining 31 were a large number who already had glasses, but of which fact the company had no previous record. There were several who did not feel their need for glasses was great enough to warrant the expense, while several others claimed they could not afford the expense. As a result of the program, the majority and most serious of the defective vision cases have been checked.

Another phase of the program was that which considered the requirements of employees with extremely defective vision to wear safety goggles continuously while on duty. A visual acuity of 20/200 is considered to be industrial blindness.

A survey of the examination revealed 63 employees with a visual acuity of 20/200 or less in one or both eyes. It was felt that such employees should have adequate protection from industrial injury that might affect the remaining vision. It was determined, therefore, to require such of this group whose duties were in any way hazardous to the eyes to wear safety goggles continuously when on duty.

In cases where prescriptive glasses would correct poor vision, safety goggles with prescriptive lenses were furnished by the company without cost to the employee. Where vision could not be improved by glasses, the use of plain safety goggles was required. Each of the members of this group was given a letter from the superintendent at the time his goggles were delivered to him, with

definite instructions to wear the goggles continuously when on duty.

It may be interesting to note of the 63 cases with vision of 20/200 or less, 31 were supplied with prescriptive goggles; 25 were required to wear plain goggles, and 7 were not required to wear goggles due to the type of work in which they were engaged.

The entire program was carried through with smoothness and with satisfaction to all concerned. Employees with defective vision were enabled to have better vision through expert service at a minimum cost. The company benefited through this fact and through the accumulation of records showing the actual condition of the eyes of each employee. This is important in the medico-legal side of defective vision in compensation cases in which the previous condition of the eye or the vision was not known. It has been possible also to furnish adequate protection to those employees with extremely defective vision.

Editorials

Prenatal Care for Syphilitic Mothers to Conserve Vision

TO THE layman it may seem at first thought to be an expensive and uncalled-for procedure to advocate the examination of every pregnant woman for syphilis at the beginning of her pregnancy, in order to assure early treatment of those who are found infected. But experience and statistics abundantly prove its value. Furthermore, it ought to be part of a general health examination; in which case this becomes only one of the many benefits of thorough medical knowledge of every woman who is about to go through the period of pregnancy and childbirth. In other ways, information on the functioning of the body—for example, the blood, the heart, the kidneys, the nervous and digestive systems, the sex organs and the various glands—is quite as important to both mother and child.

In a way, the advocacy of a blood examination for every pregnant woman—provided it is followed promptly by effective treatment when evidence of syphilis is found—is as practical a preventive measure in sight conservation as is the required practice now so generally observed of putting standard silver nitrate drops into the eyes of all newborn babies to prevent ophthalmia neonatorum. In twenty-five years mankind has benefited enormously from this procedure. As a single illustration, institutions for the blind show a reduction from more than twenty-six per cent to less than seven per cent of inmates blind from this cause. Aside from the happiness and usefulness of those whose sight has been conserved, many millions of dollars have been saved for the taxpayers. It is within the power of the people and the physicians to make an even greater saving in healthy sighted children and parents by a quarter of a century of unremitting effort to conquer congenital syphilis.

At the recent annual meetings of the American Medical Association and the Conference of State and Provincial Health Authorities of North America, the resolutions reported in this number of the Sight-Saving Review were adopted, calling for united efforts

to secure for every pregnant woman adequate examination, including tests for syphilis, and early treatment for all showing infection.

It is significant of the steady evolution of the art of medicine toward the full inclusion of preventive as well as curative practice that these two great professional groups have adopted resolutions calling for nation-wide participation of all agencies and individuals in a position to help in promoting popular understanding and application of modern knowledge to the reduction of congenital syphilis. Public confidence and participation will also be promoted by the evidence of close and friendly co-operation between professional and voluntary agencies which these resolutions show. The two national agencies specifically mentioned in the resolution of the American Medical Association—the National Society for the Prevention of Blindness and the American Social Hygiene Association—have worked together toward this end for many years. It is a matter of great satisfaction that the opportunity is now afforded for joining in a broader program.

William F. Snow, M.D.

School Eye Clinics

Parents are slow to recognize any need for glasses for their children. If the child does not observe something at a distance which the parents do, it is ascribed to lack of observation, or inattention. If the book is held too close, or writing is accompanied by frowning or twisting the face, it is assumed that the child has fallen into "a bad habit." Certain it is, that the presence of some eye defect is usually recognized by the teacher before such a thought has occurred to the mother. If children's eyes suffer from neglect, school authorities must give them some attention. Failure of parents to attend to the child's needs has called for laws compelling school attendance and for truant officers. The same kind of neglect in the field of health has to be met by a school clinic.

There are many children who come to school, handicapped for school work by defective eyes. With such eyes they cannot get the full benefit of the common school. They cannot keep up with their classmates. Necessarily they become conscious of inferiority, without knowing why it is, or that any one else is to blame for it.

They fail of promotion, drop back to a lower class, become "retarded" children, have to repeat the year's work, and are a source of increased expense to the school district. Aside from doing justice to such children, the community cannot afford this increased expense; or allow the child's deficiencies to become a permanent charge to be met by the public.

The school eye clinic is not a means for helping paupers but for preventing pauperism. It should not be associated with clinics for the medical relief for the poor. It may well be held in one of the schools, or in a school administration building. It is a "health examination," but quite different from an inspection for signs of contagious diseases, and it is less generally understood than the search for impaired nutrition, or early tuberculosis.

The school clinic cannot provide for all children entering school. Those who need its care will generally have to be selected by teachers, principals, school nurses, school physicians, and sometimes parents. Often such children will be found by a testing of vision, which should be made of every child admitted to the schools. Among the children thus assembled, a very large proportion will need glasses. But every child should be looked over for evidence of other defects—congenital or results of diseases acquired during infancy and early childhood. Although the child may not be sent because of poor vision, his vision should be tested.

The complete success of the school clinic requires that the defects found in the eyes shall be removed or remedied, so far as possible. Those who establish or control such a clinic should plan how to meet the needs of the individual child and to remove his handicap for school work. In many towns there are competent opticians who can supply the glasses needed; and can fit to the face the frames that will keep them properly before the eyes. The naming of such a person to parents and children—one who can be relied on to fill the prescription and fit serviceable frames at a reasonable price—will be a real service to the clinic and the community. Arrangements should also include whenever possible, furnishing at a reduced price or without charge, the glasses for children who otherwise could not obtain this needed help.

If the school clinic is really a free service to the children, in most communities will be found individuals who can and will help by

giving needed glasses to those children, who otherwise would be compelled to do without them. Even in scattered communities there are children who cannot gain the benefit of the common school without correcting glasses.

The follow-up of the refraction of school children may be expected to be a means of gathering real information about the changes that occur in the eyes during the years of growth and development. It is reasonable to make sure that the eyes are able to do what is expected of them as often as it is customary to test whether the child has learned enough to be advanced a grade in the school system. But, with freedom from symptoms, many children can go several years without change of glasses. Certain children, however, should be seen every year, or even more frequently.

The higher grades in school are likely to need better sight than the lower. Those who may need more help should be warned of certain symptoms that are likely to arise. All who require the special methods of sight-saving classes should be seen every few months.

EDWARD JACKSON, M.D.

The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request.

Non-Shatterable Glass in Spectacles

Many oculists have seen serious injury to eyes from broken glass of automobiles, and this hazard has become so well recognized, even by the laity, that now all the better class of automobile manufacturers put non-shatterable glass in the windshields, and, in fact, use nothing but this type of glass throughout their cars. In the past month or more, three states have enacted legislation which provides for the installation of non-shatterable glass in all motor vehicles.

For a number of years the value of protective glasses in many industries has been well recognized. On a small scale shatter-proof glass has been used in certain especially hazardous work. This glass was made only in plano lenses, and the glass used was not a high grade of optical glass; it was distinctly greenish in color when viewed edgewise. Recently a much improved non-shatterable glass has been put on the market. The glass is of the same clear, colorless type as is used generally in the optical business. The blocks are molded in toric form as for the customary lenses, and can be ground to the proper correction, within certain limitations, so as to correct the error of refraction. When mounted in frames this glass can not be distinguished from the usual lenses.

An objection frequently raised by parents, when glasses are advised for their children, is the possibility of breakage and the

danger of broken fragments of glass entering the eye and doing it serious damage, or even destroying sight. The same danger is recognized when glasses are worn by older children and adults in their various sports as well as in work.

The advantage of such glasses will readily be appreciated for myopic children, where it is so important to get them away from books and interested in outdoor life and various types of sport. Parents of such children have been especially fearful of having them wear glasses under such conditions because of the danger involved.

The slight extra expense in substituting this type of glass for ordinary lenses might well be looked upon as a small insurance investment. The writer has found many parents delighted with the opportunity of securing this extra safety for their children. We have accordingly been using them more and more frequently for the past year or two, and with complete satisfaction in every respect.

Not a few adults also are glad to avail themselves of this extra security, especially those who have been so unfortunate as to have lost one eye from an accident.

I believe, therefore, that it is well worth while to draw the attention of the readers of the SIGHT-SAVING REVIEW, lay or professional, to this new extra safeguard to vision.

WILLIAM EVANS BRUNER, M.D., Cleveland, Ohio.

Eyes and Athletics

Every boy interested in athletics realizes how important his eyes are for the enjoyment of games, whether in playing or in watching. It is not only his sturdy arm but his steady eye, as well, that makes Babe Ruth the "Home Run King." And every person who goes to see a lively baseball game certainly needs good eyesight to get the full benefit of that powerful swing of the bat which has made George Herman Ruth so famous. Bobby Jones, Bill Tilden, and the other champions of sport also owe much of their success to healthy eyes.

Each year, all over the United States, when the school term begins, school boys have their eyes tested. It may seem surprising that one out of every eight school children having their eyes tested is found to have defective eyesight. But almost all defective vision can be corrected if proper care is taken. That is why it is so im-

portant to follow the instructions of the school teacher and school nurse. Though glasses are prescribed, the wearer can take part in athletics. Only a very few school children are found who, because of very poor eyesight, require special care and cannot play the regular outdoor games and take gymnasium work with the class.

Many accidents to the eyes occur during outdoor play. Did you ever play "cat?" In crowded streets accidents have occurred when the little stick flew into the face of some innocent bystander, sometimes actually blinding him. Playing cowboys and Indians is a lot of fun, too. But sometimes boys play with guns and the shot has been known to blind one of the playmates. Every Fourth of July many serious accidents occur; some result in blindness. The danger of firecrackers is considered so great that many cities have laws prohibiting their sale.

Not only must we take care of our eyes at playtime, but also during our reading and study hours. If special care or glasses have been advised, instructions should be followed. Glasses are prescribed to be worn and not to be kept in the desk. Many baseball heroes wear glasses; special guards are now provided for eyeglasses worn in athletics.

Nowadays, every effort is made to plan new school buildings so that they are properly lighted and to have books with the right kind of paper and the correct size of type, so that our eyes may not be unnecessarily tired. The following are good rules to apply at home, as well as at school. They apply to everybody—boys and girls and men and women:

Read with a clear, good light falling from above over your left shoulder.

Hold your book about fourteen inches from your eyes.

Always read with your head up.

Keep your books clean; a soiled page is hard to read.

Avoid books printed indistinctly, in small type, or on glossy paper.

Rest your eyes frequently.

If your eyes ache, or if you have trouble seeing things distinctly, report it to your teacher or your parents who should have your eyes examined.

Note and Comment

American Social Hygiene Association Joins in Program of Sight-Saving Through Prenatal Care for Syphilitic Mothers.—In its progressive program of saving sight the National Society again participates with the American Social Hygiene Association in an intensive program to secure for every pregnant woman adequate examinations, including tests for syphilis, and early treatment for all showing infection. The importance of preventing syphilitic keratitis and other eye involvements of congenital syphilis by treating the mother's infection during the early prenatal life of the child has long been realized by public health leaders. At the recent International Ophthalmological Congress, in Madrid, Spain, it was the subject of active discussion; and Dr. Park Lewis, vice-president of the National Society, presented the American point of view. Returning to the United States, Dr. Lewis conferred with many other ophthalmologists and officers of the Society and of the Social Hygiene Association, and the joint project was begun.

Correspondence with the section chairmen of the American Medical Association, and the Conference of State and Provincial Health Authorities of North America, and officers of other professional bodies elicited the fact that there was general agreement upon the timeliness and practicability of such concerted action. Accordingly resolutions were passed by all these agencies at their annual meetings, the substance of which is well expressed in the following general resolution, adopted June 15, 1933, by the House of Delegates of the American Medical Association:

"Whereas, Prenatal syphilis is responsible for interstitial keratitis and for many uveal and neural changes resulting in defective sight and blindness as well as deafness and other defects, and

"Whereas, It has been found that above 3 per cent of the women attending prenatal clinics—in certain studies as high as 30 per cent—have shown a positive reaction to the Wassermann test, and it has been estimated on the basis of group studies that from 3 to 5 per cent of children taken in the mass have prenatal syphilis and that about half of these children without adequate

treatment develop interstitial keratitis leading to defective vision if not blindness, and

"WHEREAS, It has been authoritatively stated that prenatal syphilis can, without doubt, be prevented in the majority of cases, but only if there is complete co-operation between the patient and the various medical, social and educational agencies which enter into the diagnosis, the treatment and the care of the infected pregnant woman; and that if treated adequately in the child before organic changes have occurred, it is curable without loss of sight, and

"WHEREAS, This deplorable condition can be controlled only by combined efforts of the medical, the social and public health authorities; therefore be it

"*Resolved*, That the Section on Ophthalmology requests the House of Delegates of the American Medical Association to appoint a committee to take this subject under advisement and to arrange methods by which co-operation may be secured through the combined efforts of the American Medical Association, the National Society for the Prevention of Blindness, the American Social Hygiene Association, the obstetric and ophthalmologic societies, the American Dermatological Association, public health organizations and such other organizations as can help, in order that blood examinations may be made of all pregnant women so that methods may be arranged for the treatment of all those infected with syphilis, thereby preventing the blindness and other tragedies which would otherwise inevitably follow."

Dr. Edward Stieren moved that the resolution be adopted. The motion was seconded by Drs. Emily D. Barringer, New York, and G. Henry Mundt, Illinois, and carried, after Dr. Frank W. Cregor, Section on Dermatology and Syphilology, had stated that a similar, identical resolution was unanimously adopted by that section.

In addition to the Sections on Ophthalmology and Dermatology and Syphilology, the Section on Nervous and Mental Diseases, and the Section on Preventive and Industrial Medicine and Public Health, passed resolutions of similar purport. The chairmen of the Sections on Pediatrics, and Obstetrics, Gynecology and Abdominal Surgery approved the proposal. As voiced in the motion of the preventive medicine section, the purpose of all these resolutions

was to "show how generally the medical profession is concerned with the co-operation of all agencies in solving this public health and welfare problem."

National Eye Service Functioning in England.—The National Ophthalmic Treatment Board in England, which has been organized recently for the eye care of persons of limited means, describes its services in a series of leaflets sent to industrial organizations, state-insured persons and others eligible for such treatment. Emphasis is put upon the fact that eyes are part of the body and, as such, require the care of trained medical men. It has already been found that this type of eye care will materially aid health in England.

Can Business Afford to Let Up on Safety?—During the coming period of economic adjustment, safety practices and safety education are more than ever necessary. Safety not only reduces the insurance overhead: it also discovers, at the source, items of waste and converts them into items of plant efficiency. In one plant it was found that a thoroughgoing safety program saved $150,000 a year. Furthermore, with the prospect of speeding up production and employing new men, safety devices and regulations must be increased to prevent future accidents.

District of Columbia to Have Sight-Saving Classes.—The Congress of the United States has authorized the establishment of sight conservation classes in Washington, and has appropriated the funds to inaugurate this special type of education. This brings the District of Columbia into line with the fourteen states of the Union that have made possible education for those with serious visual impairment.

Henry Dickson Bruns.—The National Society for the Prevention of Blindness regretfully makes note of the death of Dr. Henry Dickson Bruns, emeritus professor of diseases of the eye, New Orleans Polyclinic, and member of the National Society's advisory committee; his fifty years of service in ophthalmology were recently commemorated by the erection of a bronze plaque in the Eye, Ear, Nose and Throat Hospital in New Orleans.

Junior Red Cross Spreads Sight Conservation in India.—Because there are at least one million blind persons in India, and three times that number afflicted with acute visual impairment, the Indian Red Cross is undertaking to educate the public in causes and prevention of the common eye diseases. Two brochures have been published and are being distributed to school children; the material is fully illustrated and popularly written for both children and adults. One of the pamphlets forms a program of action and demonstrates how Juniors may help those about them to safeguard their sight.

New Code Stimulates Better School Lighting.—An electric company in Michigan has undertaken to put into the hands of all school superintendents in its district a copy of the recently revised "Standards of School Lighting." When the changes are explained in terms of the present school lighting equipment, it is felt, and has already been noted, that a greater interest and comprehension of problems involved in school lighting will result in action to bring schools up to the standards outlined.

Industrial Eye Accidents in England.—Every year nearly 7,000 men in Great Britain's industries sustain eye injuries of more or less serious nature. It is computed that some 4,800 eye injuries involved a seven-day absence from work, or more, while, for 4,300, the average absence was four weeks. Nearly all of these accidents could be avoided, according to a brief article in *Industrial Welfare* (London) for May, if the proper protective devices—goggles with non-shatterable lenses and machine guards—were used and the use enforced. The Committee on the Causes and Prevention of Blindness refutes the erroneous idea that goggles are in any way injurious to the sight, and suggests that specifications for goggles to be worn at hazardous types of work in mines and in the engineering and metal trades be drawn up by the Home Office. Only through the fullest co-operation of directors and workers can this great toll of eye accidents with its frequent result of vision impairment and even blindness be reduced.

A Century of Progress in Optics.—Taking advantage of the nation-wide interest in the Century of Progress being celebrated at the World's Fair in Chicago, the *Optical Journal and Review of*

Optometry devoted its June 15 issue to a special review of the past century's progress in optical art. This issue is of great value for its tracing of optical history and preservation of the names of those who made possible modern methods of better seeing through lenses.

West Virginia Considers Its Visually Handicapped Children.—Although West Virginia has taken no action in the care of its blind and visually handicapped citizens beyond the establishment of two small schools for the blind, a state-wide survey of the situation, prepared for the West Virginia White House Conference on Child Health and Protection by Dr. J. E. Blaydes, should result in a fuller program of education and care for blind and partially sighted children. Dr. Blaydes urges the creation of a commission for the blind whose duties it would be to prepare and maintain a state register of the blind, to adopt measures for the prevention of blindness, and to conduct educational campaigns to promote interest in work for the blind and semi-sighted and in the prevention and cure of blindness. Special reference is made to the need for establishing sight-saving classes in cities, and offering to rural children the opportunities for such special education where it is needed.

Cuban National Association for the Prevention of Blindness.—Aided by the efforts of the Cuban Ophthalmological Society, a national organization for the prevention of blindness has been formed in Cuba. Dr. Manuel Anton, who has long been interested in the possibility of preventive work in his country, has been chosen the president of the new movement.

Hereditary Blindness—A Challenge.—Ophthalmia neonatorum was the cause of blindness in eighteen per cent of the pupils enrolled at Perkins Institute in 1888; today, this cause of blindness has been reduced to less than one half of one per cent in that school for the blind, and a similar tendency to decrease is seen in all parts of the civilized world where prophylactic practice has been established. Foremost of the present causes of blindness are those diseases which are inherited: atrophy of the optic nerve and congenital cataracts. What steps may be taken to eliminate or diminish this cause of blindness? ?

The Prevention of Blindness Committee of the Union of Counties Associations for the Blind, in its recent report on *Hereditary Blindness*, finds that, notwithstanding the feeling which is prevalent that blindness from inherited diseases is an important contributing factor in total blindness, the limited field of research into family history makes it impossible to gather accurate figures on hereditary blindness and eye disease. They recommend that in certification of blindness, records of eye diseases in previous generations be compiled. Of undoubted importance in the inheritance of eye diseases leading to blindness are retinitis pigmentosa and hereditary optic atrophy. Certainly, blind persons should not contemplate having children without medical sanction, and those in whose families blindness has occurred should face the fact that it may have been a hereditary trait. The record sheet accompanying the Union report should be of particular interest to students of genetics and everyone interested in the prevention of so important a cause of blindness.

Community Health—A Demonstration.—The sixth annual report of Bellevue-Yorkville Health Demonstration illustrates graphically how a fully rounded health service may utilize its own resources and those of co-operating agencies for better health and greater health consciousness in a neighborhood or community. Not only prenatal, baby and preschool clinics function, but a tuberculosis clinic, a mental hygiene service, and a health education project have given the community an intensive health service, as well as a demonstration for other urban health centers.

Visual Fatigue of Motion Pictures.—A comprehensive selection of opinion upon the visual fatigue from attendance at motion pictures has recently been published by the Amusement Age Publishing Company, New York. Not only are American opinions quoted, but a representative bibliography of world-wide observers of motion picture technique has been assembled.

Windowless Schools May Protect Eyesight.—Talking to the conference course on economics in school administration at the New York University School of Education, D. W. Atwater, illu-

minating engineer, declared that aside from the loss of outside view a windowless school would contribute to lower construction costs, more efficient heating and air conditions, and a lighting system which would give constant, dependable light. While the value of good illumination in factories and other work places has been measurable in dollars and cents, the value of good illumination during the formative years of childhood is inestimable.

Dr. Luedde Receives Leslie Dana Medal.—The Leslie Dana Gold Medal, awarded annually for the most outstanding achievements in the prevention of blindness and the conservation of vision, was presented this year to Dr. William H. Luedde, director of the department of ophthalmology in the St. Louis University School of Medicine. The medal is one of the most highly prized marks of recognition in the entire public health field. Dr. Luedde was selected for this honor by the National Society for the Prevention of Blindness, in co-operation with the Missouri Association for the Blind, through whom the medal is offered annually by Mr. Leslie Dana of St. Louis. The conditions of the award set forth that it is to be made for "long meritorious service for the conservation of vision in the prevention and cure of diseases dangerous to eyesight; research and instruction in ophthalmology and allied subjects; social service for the control of eye diseases; and special discoveries in the domain of general science or medicine of exceptional importance in conservation of vision." Lewis H. Carris, managing director of the National Society, made the presentation.

Psychogenic Blindness.—The case of a miner who suffered loss of sight after witnessing an accident in a mine illustrates the possibility of blindness, not from disease or physical impairment, but from psychological causes. Since there is no physical reason for the loss of sight, there is a tendency on the part of outsiders to refuse to accept the actuality of blindness. A recognition of the dark and mysterious realm of the subconscious makes this type of case susceptible to cure, while the scoffing attitude and lack of sympathy which such a condition often calls forth among the ignorant and unthinking results only in a persistence of the neurosis.

Handicap Prevention.—The theory that an ounce of prevention is worth a pound of cure has been universally accepted but seldom practiced, says Lewis H. Carris, managing director of the National Society for the Prevention of Blindness, in the July issue of *Rehabilitation Review.* Accidents leading to the need of rehabilitation need not occur, since it has been estimated that only two per cent of industrial accidents are unavoidable. The program for the prevention of disabling disease must spread not only to the avoidance of the disease itself, but into the health standards and health opportunities of every section and group of the population. Those who must work with the maimed and damaged members of our present society must recognize the prior necessity of prevention of such handicaps.

Eye Clinics Travel in Poland.—A broad step in preventing blindness was the organization last year of the two traveling eye clinics which, from May to September, covered the rural sections of Poland, treating cases of trachoma. Figures from the Wilno committee of the Polish Red Cross show that in the first year 65,894 consultations were given. The staff examined 13,337 school children, among whom were found 852 cases of trachoma. By making available to rural districts the urban facilities of the clinic, many trachoma victims will have their sight conserved.

American Optical Company Celebrates Centenary.—At its exhibit at Chicago's Century of Progress, the American Optical Company celebrates its own one-hundredth birthday. The company's intimate understanding of the human eye and of its refractive requirements has fostered the development of goggles for the protection of the eye from industrial hazards of flying sparks and metals, intense heat and injurious acids. The company's exhibit of goggles, whose shattered but unbroken lenses bear witness to eyes that have been saved, is most eloquent of the progress of prevention of eye injuries in industry.

National Society Notes.—The National Society announces the addition to its Advisory Committee of Miss Edith M. Baker, director of the Social Service Department at Washington University Clinics and Allied Hospitals, St. Louis, Missouri, and of Miss

Kate McMahon, director of medical social work at Simmons College School of Social Work, Boston, Massachusetts.

The honorary degree of doctor of laws was conferred by Hobart College upon Lewis H. Carris, managing director of the National Society.

Members of the staff of the National Society co-operated with many of the meetings of national health and social organizations. At the annual meeting of the State and Provincial Health Authorities of North America, Mr. Carris was the Society's representative. In collaboration with Dr. William Campbell Posey, he presented a paper on "The National Society for the Prevention of Blindness," before the meeting of the section on ophthalmology of the American Medical Association, at its annual meeting in Milwaukee. He also was present at the meeting of the Committee on the Handicapped Child, during the National Conference of Social Work, where he spoke on "The Importance of Handicap Prevention." Others attending the Conference were Miss Eleanor P. Brown, secretary, and Miss C. Edith Kerby, statistician. At the invitation of the Illinois Society for the Prevention of Blindness, Mr. Carris spoke at the Century of Progress on aspects of sight conservation.

The training courses for teachers of sight-saving classes were visited by staff members of the Society; Mrs. Winifred Hathaway, associate director, spent six weeks as special lecturer at the course given at Teachers College, Columbia University, and also lectured at the University of Chicago; Mr. Carris talked to the class for training sight-saving class teachers at Teachers College, Buffalo, New York.

At the International Congress on the Education of the Deaf, Miss Mary Emma Smith, R.N., director of nursing activities, spoke on "Sight Conservation in Schools for the Deaf."

In co-operation with the New York State Department of Labor, a series of radio talks was given over Station WNYC on various aspects of eye protection in industry.

Programs for autumn meetings include the annual meeting of the National Safety Council, Chicago, October 2–6, at which Mr. Carris will act as chairman of the session on "The Eye and Its Relation to Safety"; annual meeting of the National Rehabilita-

tion Association, Chicago, October 10, at which Mr. Carris will speak on "Co-ordination of Activities"; and the meeting of the American Public Health Association, Indianapolis, October 8–12, during which Mr. Carris will participate in discussing "Is There a Common Objective in Public Health Education Around Which All Health Organizations Can Rally?"

Book Reviews

Allergy and Immunity in Ophthalmology. Alan C. Woods, M.D. Baltimore: Johns Hopkins Press, 1933. 166 p.

A third of a century ago in his classic work on "Immunity" Metchnikoff laid down certain principles upon the specific reaction of the tissue cells to various substances. These have formed the basis of a vast number of experimental studies since that time. It was a method, as he then declared, which had so largely contributed to the prevention of disease and in which such great advances had been made under the inspiration of the discoveries and ideas of Pasteur, that medicine had become an exact science.

Metchnikoff was a research biologist, not a clinician, and while the advances have been unexpectedly great in the department of immunity, medicine cannot yet be considered an exact science. It has indeed, however, been largely redeemed from empiricism by laboratory studies, and in consequence the whole structure of modern preventive measures has come to occupy an essential and increasing degree of importance.

Roux had then already demonstrated that if the earliest cells of the frog embryo are artificially separated, susceptibility under the influence of chemotaxis plays an important rôle. The prolongations of the nerve cells direct themselves toward the organs of sense or toward the muscular fibers as guided by specific susceptibility. The mother cells are so controlled when they go toward a newly formed tissue, or when they approach one another, or come together in order to form a vascular loupe. It is the modification of this susceptibility when the cell is acted upon by certain extrinsic substances that has led to our modern knowledge of allergic reaction and immunity. In 1914 Szily, in a monograph, gathered together the scattered observations on anaphylactic effects on the eye. Much of value has been added since then. Woods' volume is the first important one on this subject in English and is especially opportune. The work is arranged in seven chapters in which the subject is systemically developed.

The author tells us that to comprehend the participation of the

eye in the immune reactions of the organism it is necessary to understand the general problem of resistance, of infection, of hypersensitiveness, anaphylaxis, allergy and immunity. These are briefly described, thereby enabling those who are not familiar with the developments in this field to follow intelligently the researches that have been more recently made. Following Zinnser, he defines antigens as a class of substances which, administered to the animal body in a manner excluding their digestive disintegration, give rise to specific alteration in the reactive capacity of the treated cells. "Experimentally it is seen that the eye is sensitized as a part of a general sensitization, the tissues of the body are likewise affected by the antigen absorbed directly by the eyes; the tissues of the eyes are capable of inflammatory reactions which appear to be purely anaphylactic in character." The work that has been done on immune-body formation in the various structures is reviewed and briefly summarized.

Interesting chapters are those on allergy and focal infections, on allergic conjunctivitis, upon the antigenic property of lens protein and uveal pigment concerning which the author's work is very well known, on syphilis, on tuberculosis and on foods, with a concluding chapter on the new specific therapy.

This is a book which every forward looking physician will wish to possess and read. The entire subject is still in process of development. Much more will be learned concerning cell reactions during the next few years and to keep pace with this progress it will be necessary to be informed on all such new work as is given to us.

There are a few slips of the pen such as speaking of Marquez as a South American, and some typographical errors, but the volume as a whole is a distinct addition to the literature of modern ophthalmology. It has a charming preface by Prof. Wilmer and is dedicated to the memory of the author's father, Dr. Hiram Woods, who was a founder and ardent supporter of the National Society for the Prevention of Blindness. The work is well documented, well bound and of convenient size to be easily held while reading.

PARK LEWIS, M.D.

THE RÔLE OF EYE MOVEMENTS IN READING WITH AN EVALUATION OF TECHNIQUES FOR THEIR IMPROVEMENT. Francis P. Robinson, Ph.D. Iowa City: University of Iowa Studies, No. 39, University of Iowa, 1933. 52 p.

Reading disabilities among college students are now receiving serious consideration by both research workers and administrative officials. It is generally agreed that reading proficiency may be improved to a certain degree provided the reader is adequately motivated. Practical means for at least partially relieving the impediment of slow reading and poor comprehension are now available at many colleges and universities in "how to study" courses and reading clinics.

In this monograph the author's purpose was to "evaluate the rôle of eye-movement habits in determining reading ability." The subjects of the investigation were retarded readers at the University of Iowa Reading Clinic. One experimental group was trained to improve comprehension, another to improve speed of reading, and members of a third group served as controls. On the second test the controls showed no improvement, those trained in comprehension made marked gains in comprehension, and those trained for speed made significant gains in rate and some improvement in comprehension. The author describes his training to improve speed of reading as "eye-movement pacing," and says "that such training improved eye-movement habits, which in turn increased reading efficiency."

The inference that "pacing" the eye movements results in more efficient oculomotor performance which produces improved reading performance cannot be accepted as valid. Practically all investigations bearing on the subject show that oculomotor habits are extremely flexible and therefore promptly adjust themselves to any change in reading proficiency. Furthermore, it has been convincingly demonstrated that any confusion or marked change in perceptual processes are readily reflected in modified eye-movement performance. It would appear that eye movements are merely symptoms rather than causes of reading status. Remedial training with no reference to eye movements is highly successful. In fact, the measurement of eye movements may be omitted in the clinic without lessening the efficiency of reading diagnosis or of remedial training.

This monograph is a sound and worthwhile contribution to the psychology of reading as far as experimental results are concerned. The author has shown that reading may be improved by specific methods of training. However, his inference that "pacing eye movements" results in more efficient oculomotor habits, and that these in turn produce improved reading proficiency is not adequately supported by his own results or by other findings.

MILES A. TINKER, Ph.D.

CLINICAL PHYSIOLOGY OF THE EYE. Francis Heed Adler, M.A., M.D., F.A.C.S. New York: The Macmillan Company, 1933. 406 p.

The correlation of ocular physiology and clinical ophthalmology is a very necessary step in the development of the ophthalmologist. It often happens that young men beginning to study for the specialty request advice on works on the physiology of the eye. Heretofore it has been very difficult to make suggestions which would supply the need. Dr. Adler's fine work on the *Clinical Physiology of the Eye* supplies this defect in the literature. A number of works are available containing sections on ocular physiology and there are a number of elaborate treatises on physiological optics. These works are difficult reading even for the matured ophthalmologist and are extremely difficult for the beginner to interpret in terms which can be applied directly to his practice. *Clinical Physiology of the Eye* is written in clear straightforward English, avoiding all stilted and complex forms of presentation; in fact, the style is so attractive as to sustain interest, and one is carried through the various phases of metabolism of the eye, the physiology of vision and the physico-chemical processes associated with the perception of light, without being aware that he is passing through a very intricate maize with a minimum of mental exertion. The author's numerous contributions to ophthalmic literature have demonstrated beyond question his fitness to present a work of this kind and make one feel confidence in the opinions he expresses. His selection of material for a book on clinical physiology of the eye has indeed been very appropriate and very well developed both as a text and a reference book.

JOHN N. EVANS, M.D.

Eye, Ear, Nose and Throat for Nurses. Jay G. Roberts, Ph.G., M.D., F.A.C.S. Philadelphia: F. A. Davis Company, 1931. 213 p. Ill.

As a conviction after twenty years of work in a special field Dr. Roberts states in the Preface that "in no department has the nurse's education been so neglected as in diseases and surgery of the Eye, Ear, Nose and Throat." *Eye, Ear, Nose and Throat for Nurses* is offered as one means of overcoming this deficiency in the nurse's training.

In the Introduction, usual procedures in general and special surgery of eye, ear, nose and throat are contrasted. Logical arguments are advanced in support of the recommendations for preparation, technique, treatment and care in the special field.

Significant is the first paragraph of the opening chapter: "Upon no one faculty is the human race so dependent for happiness and a useful life, as good sight, yet there is perhaps no organ of the body more neglected, abused and misused through ignorance, indifference and neglect, than the eyes. It becomes the duty of the nurse, as in other lines of public health, to educate the public in the care and conservation of this important function."

This is followed by an outline of the development of the eye, its care from infancy to maturity, and a detailed discussion of anatomy, physiology and diseases of the eye. Emotional reactions to eye surgery are presented sympathetically. Drugs, their effects, and treatment of unfavorable reactions, are emphasized appropriately. A list of "don'ts" comprises one chapter. The negative form is resorted to, in all probability, for emphasis and immediate results. Concluding features are a glossary and index.

As a text, or reference, *Eye, Ear, Nose and Throat for Nurses* is an acceptable addition to literature in this field. It is written in a clear, concise, convincing manner, and generously supplemented with illustrations. Its physical make-up contributes to ease and efficiency in reading. The author's approach is particularly significant in that it recognizes the psychological and public health aspects of the special diseases under discussion.

Lula P. Dilworth, R.N.

Contributors to This Issue

Dr. Luther C. Peter, professor of ophthalmology at the Graduate School of Medicine, University of Pennsylvania, interprets for the layman his thorough knowledge of eye disease.

Dr. Percy W. Cobb is associate professor of applied biophysics in ophthalmology at the School of Medicine, Washington University, St. Louis.

In addition to being ophthalmologist on the staff of the New York Eye and Ear Infirmary, **Dr. Conrad Berens** has devoted much time to the problems of the Lighthouse Clinic for the Prevention of Blindness and the Eye Clinic of the Seamen's Church Institute.

Dr. A. L. Adams is the attending ophthalmologist of the Illinois School for the Blind. **Miss Audrey M. Hayden** is executive secretary of the Illinois Society for the Prevention of Blindness.

Mr. R. H. Seip's position as chief of the safety division of the New Jersey Zinc Company gives him an opportunity to carry out a well-rounded eye protection program.

General director of the American Social Hygiene Association, **Dr. William F. Snow,** again joins with the National Society for the Prevention of Blindness in a campaign to prevent congenital blindness.

Dr. Edward Jackson, emeritus professor of ophthalmology at the University of Colorado, is consulting editor of the American Journal of Ophthalmology.

Among the book reviewers: **Dr. Park Lewis,** vice-president of the National Society, needs no introduction to Review readers; **Dr. Miles A. Tinker** is assistant professor of psychology at the University of Minnesota; **Dr. John N. Evans** is director of research at the Brooklyn Eye and Ear Hospital; **Miss Lula P. Dilworth, R.N.,** is assistant in health education in the Bureau of Public Instruction, New Jersey.

Contact Glasses

Willis S. Knighton, M.D.

ACTORS and athletes, especially, find contact glasses valuable; upon the stage and in certain sports, they are sometimes indispensable

DURING the past year or so there have been several articles in the lay press pertaining to a new invisible glass which could be worn under the lids with comfort, thus doing away with ordinary spectacles. Unfortunately, there has thus arisen in the minds of the lay public a rather false impression concerning "contact glasses."

In the first place, these lenses are not new. Credit for their invention goes to Herschel who apparently made the first glass in 1827 by casting from a gelatine negative. His purpose was to correct only glaring errors of refraction which could not be helped by the use of ordinary lenses, and although his success was limited by the crude manufacturing instruments at his disposal, he initiated a series of experiments which have contributed greatly to our present knowledge. Perhaps the most important of these were the experiments of A. E. Fick in 1887. As the result of his demands for better contact glasses, manufacturing methods were improved, and today we have two highly specialized forms.

The Zeiss glass is ground very accurately and can be made to suit the curvature of any eye. It is a clear bowl-shaped shell in which the central portion is usually slightly elevated. This is the corneal segment; it is the more important part as far as vision is concerned for, by the use of different curvatures, different types of refractive error can be corrected accurately. The outer rim of the contact glass is the scleral portion (that part covering the white of the eye) which, although it has nothing to do with the

correction of vision, is fully as important to the patient because it determines the wearing comfort. The whole glass, being perfectly transparent, is invisible to any but the most critical observer.

Contact Lenses

The Mueller glass is blown instead of being ground and, although it is perhaps one of the most perfect examples of the glass-blower's art, it is not nearly so accurate in its curvatures as the Zeiss glass.

Courtesy of A. Haustetter, Inc.
Appearance with Regular Spectacles

Appearance with Invisible Contact Glass

As a matter of fact, all fittings with the blown type of glass must be made more or less empirically by selection from a large number, and when one of these glasses is to be replaced, the same patient selection must be resorted to as in the first test. (When the ground glass is to be replaced, the patient simply orders another of the

same curvatures.) The blown glass looks more like the shell of an artificial eye. The central corneal segment is transparent as in the ground glass, but the scleral segment, which is oval in shape and broader than the ground glass, is opaque and colored to represent the patient's sclera, so that, although it is not invisible, its colorings and markings look like the patient's eye.

How Contact Glasses are Worn

A contact glass is worn under the lids with the scleral rim resting directly upon the patient's eyeball, i.e., over the sclera. The corneal segment is separated from the patient's cornea by a thin layer of normal physiological salt solution. Upon these two conditions depend the main advantages and disadvantages of the glass.

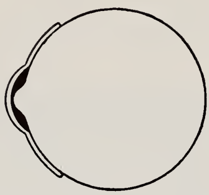
In the first place it is impossible, mathematically and optically, to correct any error of refraction by placing a fixed lens half an inch in front of a moving eyeball. This is the condition which obtains when ordinary glasses are worn. In small refractive errors the inadequacy of this system is not noticed by the patient, but in higher errors there is distortion at the edges of the correcting lens and the field of useful, clear vision is limited. The contact glass, being worn upon the eyeball itself, becomes a definite part of the eye's optical system and maintains exactly the same correction for every position of the eye, giving the patient a wider and more natural field of clear vision. Indeed, most patients wearing contact glasses for the first time exclaim over the general clearness and brightness of objects even though the central vision may be no better than with their old glasses. Such a clear field of vision is so important and desirable that every ophthalmologist will endeavor to preserve it at all costs.

Among many other technical defects of ordinary lenses which can be overcome by the use of contact glasses, is the condition of unequal refraction in the two eyes. Many of these patients can never find real binocular comfort with ordinary spectacles. This is especially true where a cataract has been removed from one eye while the other has normal vision. When a contact glass is worn over the aphakic eye (the one from which the cataract was removed), the two eyes are enabled to work together in harmony.

The most dramatic correction of vision is found in those cases

of keratoconus, or conical cornea, where the cornea is so irregular in shape that ordinary lenses can never help much. As soon as the contact glass is placed over the eye, however, with the physiological salt solution in the corneal segment, the patient's irregular cornea is rendered inoperative. It disappears from the picture, just as a glass rod may become invisible when it is placed in a tumbler of water, and because it is replaced optically by the regular curvature of the contact glass, the patient immediately obtains vision through an undistorted artificial cornea.

High degrees of astigmatism, where the faulty curvature lies in the cornea, may be corrected similarly, but where the astigmatism lies inside the eye, i.e., in the crystalline lens (lenticular astigmatism), contact glasses are of no avail. Except in this type of astigmatism, contact glasses approach the perfect correction of refractive error more closely than any other form of lens known.



Eye with conical protrusion of the cornea (keratoconus) and correcting contact glass.

In high errors of hyperopia or myopia, contact glasses may be used to correct the refraction by providing the patient with an artificial cornea that is more curved or flatter than his own, as the case requires. This would do away with ordinary glasses, but whether it would be advantageous would depend upon the amount of error corrected and the patient's personal requirements.

Contact Glasses Safe

Strangely enough, the fact that they are worn under the lids must be listed as an advantage as far as danger from breakage is concerned. The lids themselves afford a protection denied the wearer of spectacles. One patient reported an automobile accident in which he was thrown from the car and knocked unconscious. His contact glasses survived in position, but ordinary lenses would undoubtedly have broken and might have done considerable harm. In other respects, this position under the lids in the ordinary wearing of contact glasses has yet to show any deleterious effects upon the patient's eye. As a matter of fact, several authors have felt

that some of their cases of keratoconus have shown improvement after several months' time.

The blown glass is supposed to be better tolerated by the patient because of its smoother edges, but experience seems to show that, when the ground glass is properly fitted, it is just as well borne. Four or five hours a day used to be considered a good wearing time, but lately there have been more and more reports of patients wearing their glasses as long as twelve to seventeen hours daily. One patient has worn his to bed several times because he forgot they were in position! The greatest difficulty seems to be encountered in the irritation to the lids, even where the fit to the eyeball is perfect. Usually this is soon overcome, but when it persists the patient must recognize his limitations and remove the glass at intervals until the lids become more tolerant. It follows naturally that when the contact glasses are *necessary* to good vision the patient will persist in his efforts to overcome the initial strange feeling, but when ordinary lenses will do just as well, they offer an avenue of escape every time the lids feel uncomfortable. It is my experience that patients with irregular refractive errors which are not benefited by ordinary lenses, invariably learn more quickly to use their contact glasses and wear them longer each day than those patients who try to wear them for the sake of vanity or as an experiment.

Future of Contact Glasses

Any competent ophthalmologist who understands the principle of these glasses will find little difficulty in fitting them to a patient's eyes. It is customary to use a mild local anesthetic at the first examination while determining the corneal curvature necessary for the patient's best vision, and in this manner to accustom the patient to the idea of wearing something under his lids. At subsequent tests the anesthetic is omitted during the search for the scleral curvature which gives the most comfort and fits best. These examinations are very important in determining adequate clearance between the patient's cornea and the glass, and in securing even pressure of the scleral segment. Many trials may have to be made before the patient and the doctor are both satisfied, but in the end the patient should be able to wear the glasses with perfect comfort.

The knack of inserting and removing them is easily acquired. The trick in avoiding air bubbles in the corneal segment comes soon after and most patients remove their glasses once or twice a day, if the solution tends to become turbid.

Contact glasses will never entirely replace ordinary lenses because of their greater cost, and because they are less simple in manipulation and in adaptability to the ordinary requirements of a rest glass or a reading glass. Upon the stage and in certain sports they may be indispensable but the patient must decide for himself whether they are advantageous in his particular field of activity. Unless their superiority is obvious, he would better stick to his old glasses.

Many types of error are benefited beyond the greatest hopes of the patient, and, to those unfortunates heretofore economically blind because of irregular corneas which nothing else could correct, a new world of useful vision is opened.

Home Treatment of the Eyes*

William L. Benedict, M. D.

SOME popular fallacies about home treatment of the eyes are described here by Dr. Benedict, who cautions against attempting home remedies instead of consulting a physician

WHEN we consider the great variety and number of hazards to which our eyes are exposed in the ordinary pursuits of life, the wonder is that many more people are not deprived of the faculty of vision or are not so handicapped by poor vision that they become a heavy economic burden on the State. Exposed as the eyes are to flying particles in the air, to drying and hot winds, to extreme changes in temperature, and to flashes of bright light, serious injuries are relatively infrequent as compared to injuries of other parts of the body. This is partly because the eyes are well protected by being situated in a bony orbit, and partly because they lie behind the eyelids, which can be quickly closed against mild external injurious agents that attack them from without.

Injuries to the eyes have decreased in number since the early stages of industrial development, when protective devices on machinery were not commonly employed. The incidence of diseases of the eyes caused by infection has been greatly reduced by measures of personal hygiene which people in general have adopted, and because they have come to understand that diseases such as granulated lids and other acute inflammations can be spread by personal contact. There has been an effective campaign against industrial injuries to the eyes and against the propagation of disease of the eyes by insanitary practices. Blindness has been ma-

* Read as part of the Sunday afternoon program for the public under the auspices of the American Academy of Ophthalmology and Otolaryngology, Boston, Mass., September 17, 1933.

terially reduced as a result of campaigns carried out by members of the medical profession and by organization of laity. There is yet great work to be done in educating the public in the care of eyes that have been injured, in the treatment of minor ailments or diseases of the eyes, and in the treatment of diseases of the eyes in their early stages. We cannot expect that a large number of people will be sufficiently acquainted with remedies for diseases of the eye to know what to use under given conditions or to have available the remedies which are commonly employed by physicians.

It is possible, however, to obviate a great many of the improper practices that have been handed down through tradition, and to substitute proper procedures. The "safety first" campaign during the past few years has materially reduced the incidence of industrial accidents, and by a similar campaign people can be taught the best practices to employ in cases of minor injury and in the early stages of diseases, not only of the eyes but of other parts of the body as well.

It is in obedience to a natural desire that people wish to employ some means of mitigating the sufferings of those who are injured. It is natural to attribute a cause to every physical disorder. Often the remedies applied are associated with the type of injury received. Extracts from herbs and juices of plants are recommended for certain types of injury or disease, and in the absence of definite information the mind quickly reverts to the use of some home remedy. The result may be beneficial; often it is harmful, many times indifferent.

Because the general public has learned that many eye lotions are put up in a solution of boric acid, the better informed immediately turn to this solution as the one safe substance that can be used for any disorder of the eye. Hence, we find that many people are using an eye cup, giving the eye a daily bath in boric acid solution, in the hope that their disorders will soon pass away, and the necessity for visiting a physician may be obviated.

I do not wish to condemn this practice, but merely to cite it as an example of what persistent mention of a single agent will do toward getting the public to understand its use. The healing properties of boric acid are infinitesimal. It is used chiefly by physicians as a vehicle to carry small dilutions of more potent drugs,

and because it retards the growth of fungi or of contaminating bacteria, it forms a convenient way to dispense medicines for the eye.

I think there is very little understanding on the part of the public as a whole that a most potent antiseptic agent is supplied to the eye by natural means: that is, by the tears. Laboratory experiments have shown that for most disease-producing organisms, normal tears are hundreds of times more effective in protecting the eye than solutions of drugs in such strength as can be borne. The tears are supplied in amounts that are properly regulated, and counteract the effect of most air-borne bacteria. There is not sufficient reason for the regular use of eye baths, as there may be for cleansing the teeth or gargling the throat. The practice of giving eye baths with any solution when eyelids are not diseased, or except on the advice of an oculist, should be discouraged. People should not be influenced by propaganda from some radio stations or through beauty columns of some newspapers to indulge in practices that have no virtue in themselves and constitute unnecessary or even harmful attempts at hygienic practices.

There are very few remedies for the eyes that are specific; that is, remedies which are designed to counteract particular diseases or disorders of the eye. For many years people have used an extract of a certain seaweed to retard the development of, or to dissolve, cataract. Many years ago the recommendation of this drug was so strong that it was included in encyclopedias and in dictionaries and textbooks. Fortunately, its use in this country is, I believe, rare, and I am convinced that there is no scientific foundation for the statement that its use has any of the effects claimed for it. This same statement, I may say, holds true for other substances that have been recommended for retardation or development of cataract.

There is not one bit of scientific proof that there is any drug or other agent by which the development of cataract can be generally retarded, or by which cataracts can be removed without operation. A great deal of experimental work is being carried out in laboratories and clinics, by members of the medical profession, with the hope that some means will be found to obviate the necessity of operating for cataracts. Gleams of success here and there appear

in scientific articles written for the information of those engaged in similar pursuits and who know how to evaluate the results recorded, but such articles should not be interpreted by the public as having much significance. Physicians may prescribe drugs or diets or exercises with the hope that by this means the development of cataract may be influenced, but such advice should never be passed from one to another as an acceptable practice.

The public never can be expected to appreciate the specific value of drugs, to be able to know in what strengths they should be used, to know how they are prepared, how they are to be dispensed, or how long they can be kept without deterioration. Most of the drugs that are used for the eye are used in high dilutions and must be freshly prepared. The practice of having a medicine cabinet in the home, with medicines, drugs, and chemical solutions, is, in most homes, more of a detriment than a benefit. Serious injuries to the eyes sometimes result from the use of medicine from the wrong bottle, or the drug itself may become so inert through age as not only to be ineffective but even harmful. If medicines are to be used for the eyes, they should be prescribed for a specific ailment, freshly prepared, and immediately disposed of when their use is no longer required. Many diseases of the eyes are so similar in appearance and so similar in their courses that one person will recommend to another that he use the same remedy that has been effective in his own case. Such a practice is harmful, and many serious accidents have come about through this means. By the continued use of medicines far beyond the time recommended by the physician, the eyes may be discolored, stained, and otherwise permanently changed. Medicines for the eyes rarely should be kept for more than two months.

I think it is well known and appreciated by people at large that there are no miraculous cures for any diseases or disorders of the eye. The faith that our grandmothers had in the use of goat's milk, sauerkraut juice, snake oil, milk and honey, or tobacco juice, has been largely dissipated by an intelligent public. They realize that there is no virtue in the hair of the dog that bit them. They know the value of cleanliness and the necessity of seeking medical advice when the symptoms of disease appear. They have learned that it is not advisable to attempt to remove foreign bodies from

the eye in workshops where the instruments used may be so contaminated as to result in disease of the eye more serious than would be caused by the original injury. They have learned the value of prophylactic treatment of the eyes of the newborn, which has reduced the incidence of babies' sore eyes and consequent blindness to a great extent. They have learned to discount the claims of cures made by some dispensers of patent medicines and are rapidly learning to discount the statements made by some radio salesmen and by some writers in beauty columns. The price the public has had to pay for its experience has been the loss of sight for thousands of people through misinformation, through misdirection, through misplaced confidence, and through ignorance. Members of the medical profession stand always ready to give to the public the results of the experience gained through years of clinical practice and laboratory experiments. They have only a desire to help and cannot countenance misdirection or misinformation for pecuniary gain.

I would say very emphatically, be cautious of any home remedy. Be free to consult your physician and in this way help to preserve and maintain the great blessing of vision for all.

Eyesight in Mental and Physical Development

Arthur P. Wilkinson, M.D., F.A.C.S.

CHARACTER and personality are shaped by eyesight, Dr. Wilkinson believes; the nearsighted child may become an introvert and the farsighted child may develop into an extrovert, if correction is neglected

A FEW days ago I was having lunch with one of my friends who is a dentist. He mentioned a colleague of his who showed certain eccentricities. I said, "Well, he is nearsighted." (On several occasions I had noticed his thick concave lenses.) With a questioning look on his face my friend inquired, "What has that to do with his personality?" So I began to point out a few characteristics of this man about whom I knew little.

"He has the personality of an introvert—that is, he is self-centered, selfish, has a reputation of being a 'know-it-all,' has few friends, and is never considered 'one of the bunch.' " "Well," my friend remarked, "very good, but why? I never thought of eyesight as having any effect on character." So the discussion deepened.

The experiences of the early years of a boy's life mold him into a certain type of individual, with actions and reactions as definite as chemical reactions. Whether changes take place in a test tube or in the body makes no difference. But we must realize that the biological organism is a very complex chemical factory. For example, our mouths water when we see good food. What has this to do with our present subject? It helps to show that for every action there is a reaction; personality is the sum total of reactions. Therefore, these first actions and reactions mean everything in the young, plastic individual.

The Making of an Introvert

The nearsighted child cannot cope with his playmates on the playground. He is never wanted on a ball team, for he cannot see the ball until it is within a few feet of him, whether it is at the bat or in the field. At basketball the hoop is indistinct. If he is strong and big enough he may play in the line on the football team, but it is difficult for the nearsighted child to weather the storm and become strong.

Early in life he finds that he gets more pleasure from reading than from playing games. At school he remains indoors and talks with the teacher, while the others are out playing, and he is often the teacher's pet. It is quite easy for him to read, as the nearsighted eye needs to accommodate less than the normal eye. So the moderately myopic or nearsighted boy becomes a bookworm and, in time, an unbalanced individual, and does not develop the qualities that are needed for leadership in later life. He does not care to take walks nor does he appreciate a beautiful sunset. The trees appear to be large green blotches. No individual leaves are differentiated and the horizon is only a haze. Thus, he has none of the diverting influences that draw the attention of the normal child or the motor-minded boy to the roads, fields, parks and woods. Such a child soon appreciates that he cannot excel in games and gets satisfaction from conquest of the mind.

Unconsciously, he develops the attitude that ball games, fishing and walking are a waste of time, because he finds his games in books. Besides, it takes a whole day to go to a football game and come home again, while he may see a dozen games in print and go half or all the way around the world in that time. Unfortunately, however, the armchair sportsman gets none of the fresh air, sunshine, and fellowship that are so important in stimulating an appetite, making strong muscles, and building up personality.

The nearsighted boy reads hour after hour with his head coming nearer the book until, after a time, he rebounds as his nose touches the paper. But his spine cannot come out of the kink and he may grow up to be a pale, round-shouldered, stooped individual, who is a pathetic sight. Curvature of the spine may occur among the

nearsighted, and for this reason, as well as their more sedentary habits, they may be good subjects for tuberculosis.

A nearsighted child is not dependent on others for his entertainment and is likely to grow rather contemptuous of their abilities. He adapts himself poorly to his surroundings and may become a disagreeable person.

Environment and parental training and influence are very important but these may fail to develop broader interests in the child if the eyes are at fault. Bookworms possibly do make many contributions to the intellectual life of the race, but they might be able to do more if they were more likable and adaptable. It is usually possible to correct the defect; hence, it is all the more regrettable that unfortunate personality traits should be permitted to develop for lack of proper correction. When the sight is brought up to normal the child can do and enjoy the things other children do and enjoy. We are told that "Teddy" Roosevelt was a very pale boy with a poor physique. He was nearsighted and this might have been a factor in his physical development, for we know that with glasses he did all the things any normal child or man could do.

The psychological complications arising in those afflicted with cross-eyes need not be elaborated here, since they are so obvious and have been so frequently considered. In this connection, it is well to remember that the earlier cross-eyes are corrected the better the opportunity for cosmetic improvement and for visual and psychic health.

Astigmatism and Eyestrain Affecting Personality

Astigmatism is simply an irregular curvature of the eye in one axis. When an individual with this defect focuses on the stripes of a suit in the horizontal, the ones in the vertical plane are not seen or are distorted. Individuals with astigmatism will often tilt their heads to one side and thus are often subject to lateral curvature of the spine.

Vision often accounts for some of the peculiarities in dress seen on the street. It may be responsible for good or bad taste. Remember this about vision: no one ever saw with your eyes and no one thing appears the same to any two people. It is a physical impossibility. This is often demonstrated on the witness stand

and is too often taken lightly and evidence thrown out because two persons saw the same thing differently at the same time and place.

Eyestrain of any kind brings premature wrinkles upon the forehead. Have you seen individuals with vertical wrinkles in the middle of the forehead and crow's-feet at the outer angle of the eyes? These people are nearsighted. Those who are farsighted have wrinkles across the forehead.

Many men and women who have become nauseated while riding in an automobile or train have doctored themselves for stomach trouble for months and even years, only to find themselves entirely cured when fitted with correct glasses. Often I have seen people cross as bears because they suffered from terrific headaches caused by eyestrain. It might be well to enforce a law compelling the crabbed to have their eyes tested. Glasses would surely help some. Peculiar mannerisms may develop if visual defects are allowed to persist uncorrected.

The Making of an Extrovert

What are the characteristics of the farsighted child? His teachers say he is lazy, a mischief maker, inattentive, or motor-minded. "He is bright enough but just won't study," is often said of him. He plays truant and wants to leave school. The boy is a jolly good fellow; the girl is a tomboy. Huckleberry Finn was farsighted, I am sure. Some people might find a farsighted boy stupid; others will observe how well he can do some things. He hunts well and is an excellent shot. He is often a leader in athletics.

The farsighted child, as is the case with any child, may or may not have good mentality; but he is consciously handicapped so far as near vision is concerned and may seem stupid in those very activities in which the nearsighted excel. Although the farsighted child sees much better at a distance than at close range, he is always under more or less eyestrain. The ciliary muscle is a small muscle within the eye which adjusts the lens of the eye so that images are focused upon the retina, or sensitive part of the eye. In a farsighted child the ciliary muscle is constantly being used to focus the image clearly, whether it be in the distance or nearby; but the strain for close work is so much greater that he chooses

those activities requiring distance vision and avoids those involving the greater strain—reading or close work of any kind.

The human race has had many types of language for several millions of years but printing is a fairly recent method of expression. Thus the constant use of the eyes at close range is a newly acquired need. When we look into the distance the normal eye is relaxed; but when we are reading there is contraction of the ciliary muscle. When there is an error of refraction, particularly in farsightedness, there is an undue and often unbearable load on this muscle. You have possibly all heard of "writer's cramp" occurring after a person writes for a long time. In the same way, commonly, reader's cramp, or spasm of the ciliary muscle of the eye, is found. Thus, a powerful athlete who would scoff at the idea of fatiguing his arm and leg muscles might suffer almost unbearable fatigue from the tiny muscles of his eyes.

Of course, primitive man was farsighted. He had to be to cope with the wild beasts, and other natural elements surrounding him in the wilderness. The nearsighted man would not have survived long; he could not have done so for he could not have seen dangers in time to reach safety. Thus, the nearsighted man was less adapted to primitive life and the farsighted one is less adapted to the long hours of reading necessary these days. Nearsightedness is on the increase and perhaps statistics would show that there may be a relationship to the amount of time spent in reading.

Correcting Vision Defects

Why have glasses become so common and do they weaken the eyes, as some people would have you believe? They have become common because the need for them is being recognized, and, instead of weakening, they tend to strengthen the eyes. In explaining this to my patients, I give the example of the leaning house which, if uncorrected, may fall to the ground, but which, if adjusted and leveled on its foundation, may stand for years. This is true of the eyes. The corrective lens placed before the eye is analogous to the leveling process in building. It is not uncommon in nearsighted individuals to find blindness due to tearing of the sensitive structures of the eye, caused by trying to adjust beyond its power.

I shall never forget a nearsighted patient—mother of eleven

children. She was unable to recognize anyone who came to her door and could distinguish her children only when they were within a few inches of her. She seldom went out for she was afraid to cross the street, as she could not see an automobile until it was within a few feet of her. She had never worn glasses, and she had some tears in the membranes of each eye. However, her sight was still quite good with proper glasses; in fact, the contrast was so great, I hesitated about giving her the glasses with which she could see best, since many individuals cannot stand the nervous shock of the sudden change from seeing little or nothing to seeing many things. One week after getting proper glasses, this woman returned to me a changed person. She had never before realized what enjoyment she was missing. Her whole surroundings had changed. Before, her sphere was from inches to a few feet; now, the world was so large and different. She could not only recognize her children in the house and yard but could appreciate their enjoyment in play. How can one estimate how much this woman had missed in life?

Did you ever play golf with a nearsighted individual? I did—once! He hit the ball and I hunted it. After the ball left the tee it was a blank to him. He never knew where the green was, and he was just as likely to play my ball as his own on the second shot. A few weeks later, I was with another foursome when the same man came up behind us trying the game again. We were all quite peeved for he had been driving into us and finally hit one of the foursome. I soon stopped a quarrel by helping this man out of his difficulties for I understood that he could not see us down the fairway. But, when I tried to explain to my golfing friends that it was unintentional and that he was a fine chap, but handicapped, they were merely amused.

It is easy to see why all of this is so vital when we realize that our eyes give us the larger part of our information. It is only natural that the nearsighted boy should become the peculiar, anaemic, bookish type and that the farsighted boy should be such a healthy specimen, though unruly and sometimes a truant from school. But how can we expect the latter to be otherwise when his muscles in general are eager to exert themselves and his eye muscle must be so strained that reading is really painful to him. No one would

ask a child to walk on a sprained ankle without a crutch; we should consider it brutal to put a boy in a football game with a sprained ankle or back. Yet to a child with crippled eyesight we say, "Go to school, sit down and study." We keep torturing him until he leaves school and takes a job where the afflicted muscles may get that long-needed rest.

But sometimes the individual is put to work at a bench or a machine in a plant, when he again has the same old trouble. At the factory he plays truant and goes to a game to forget his discomfort. These lapses from working routine increase; so he drifts along and after a time begins to sink deeper and deeper. He does not read the papers but he gets his information from others. He votes as his friends advise without reading the qualifications of those running for office. He gets older, regretful that he did not stay at school to get an education. Soon he has boys of his own and they go through this same struggle. Old, poor and unkempt, he presents a pathetic picture, but a new generation of his type is in the making, if care is not taken to prevent it.

While the sad spectacle I have portrayed may seem somewhat exaggerated, none the less there is no doubt that visual defects which handicap the child may be responsible for character defects in the adult. No effort should be left undone to make the child perfect physically, so far as is humanly possible, so that untoward personality traits may not develop to handicap him as he matures.

Conserving the Sight of Myopic Children*

Albert Louis Brown, M.D.

NEARSIGHTED children may be guarded from psychic disturbances—such as self-pity and a feeling of being "different"—by placing them in groups of children who are also myopic; the similar eye conditions establish a common ground for understanding

THE clinical status of myopia at present is that control is practical, cure is not; and that prevention remains for the future.

Theories regarding myopia probably originated with Roger Bacon, who, because he discovered that a concave glass gave myopes better vision, was persecuted for dealing in magic. Much European literature up to 1885 dealt with the dangers of wearing glasses for myopia. These earlier writers did not have a clear conception of the mechanism of this condition and thought that since the accommodation has to be used with glasses, more stretching and pulling would result in increased myopia. Only a few men distinguished the different types. In 1885, Foerster of Breslau reported cases wearing an over-correction for myopia, which resulted in no progression. This work was published in English and made a great impression and opened the way for the modern approach.

Myopia, simply stated, is essentially a long eye. The focusing apparatus is inadequate to cause the rays of light to meet at the macula (center of vision). The simple types of anatomically large eyes usually have normal vision with the proper glasses, do not become progressively worse, and give rise to no untoward symptoms. The progressive type is usually hereditary, is manifest at

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ten to fourteen years and in spite of glasses, usually increases in degree until about the age of twenty-five years, the period of greatest increase being from ten to eighteen years. Much has been made of this period of increase, for it is the time of greatest growth and also of school activity. The causes for increase have been attributed to excessive near work, rapid bodily growth with thinning of the ocular tissues and faulty glandular readjustment. Thirty years ago, children of this type were forbidden all close work because it was argued that the act of accommodation and leaning over a desk stretched the tissues. This factor is not denied today, but it has been found that for the myopes whose vision and ocular structures are normal, glasses, in full correction, relieve the convergence strain, which was before discounted for the accommodative pull. The eyes of a person having an uncorrected myopia of over two diopters have to turn excessively during close application. This is relieved by a full correction. The misunderstanding of the relations between accommodation (the focusing of each eye for near vision) and convergence (the co-ordination of both eyes) is responsible for the major differences of opinion regarding glasses. It has been fairly generally accepted that the normal relation between accommodation and convergence is more nearly approached by constant full correction in myopes whose vision and ocular structures are fairly normal.

The next class of myopia is really not a separate one, but I am so dividing it for the sake of discussion. It also happens to be the one of greatest interest for this group. This division deals with the high, progressive myopes, with loss of vision even with correction. As you may easily imagine, the progressive cases might have normal vision early in life and, if tissue destruction ensues, become candidates for visual conservation. This occurs in eyes congenitally defective with a tendency to myopia at birth. Normal eyes at birth are slightly hyperopic and become less so during growth, until about the fifth or sixth year. At this time, the eyes have reached their maximum size. This is the reason that all children of school age should be examined for errors. If the eyes of an infant of one and one-half to two and one-half years are myopic, that child will always be myopic and probably have the progressive if not the malignant type of myopia. If discovered sufficiently

early, such a child should be fitted with glasses at the age of two. Parents may not notice any defect, but frequently one eye is turned or the child holds his head very close when looking at a book or does not recognize objects at a distance when he really knows them. The oculist examines the child's eyes with drops and, by a mathematical measurement with an instrument known as the "retinoscope," can prescribe accurate glasses without the child's co-operation. If the correction is more than $-2D$, the child should wear glasses constantly, for this at once establishes retinal vision, whereas, if the child is not actually using all the vision it should have with a full correction, there will be an atrophy of disuse and a permanent loss of vision will result. This principle is found throughout medicine, in that when an organ is not used, it atrophies from disuse. Besides this, the stress of convergence is reduced. The relief of these two factors tends to put the eyes in a condition more nearly approximating the normal.

The conservation class receives those cases in which this last type has progressed to a point where tissue destruction has reduced vision. These must be guarded most intelligently. At a very early age, these children recognize that they are different from their normal fellows in school and at play. They quickly develop psychic disturbances and are usually found sitting alone and reading. These two factors are deleterious in themselves. They should not be allowed to single themselves for self-pity, but should be placed in groups of children like themselves, whose similar conditions at once establish a common ground for understanding. Their reading habits can be controlled for the sake of their eyes without the obnoxious comparison with their normally sighted mates. Thus, they are encouraged to continue their education without becoming indifferent because they cannot keep pace with others. This at once establishes a personal confidence and a cooperative spirit with the teachers and doctors.

This attitude makes the subsequent history of children with progressive myopia much more favorable than it otherwise would be. They learn instinctively that they are going to be limited in the use of their eyes. With intelligent guidance, they also learn their visual limitations. Cases of pure myopia (that is, without other ocular defects) with vision less than 20/60 should be fully cor-

rected by glasses at first to determine their ability to be comfortable with such correction in the hope of limiting progression. The early aim should not be concerned primarily with a child's education, but with limiting progression of the myopia. This may be done by glasses, by very short reading periods with the proper type and light, by active physical exercise under guidance, and by learning adaptability in the manual arts in which sight is not a prime factor. Since it is probable that malignant myopia is due to some general constitutional cause, myopic children should be inspected periodically for any physical defects, especially those of the internal glands. This is particularly true of the progressive cases. Malignant myopia may lead to tearing of the retina. As the sclera stretches, thereby producing longer eyes, the internal tissues are likewise stretched and torn. Whenever a tear occurs in the macula, central vision is either suddenly greatly reduced or lost. The vision around the macula attempts to make up for lost central vision, but is wholly inadequate.

High myopia is commonly associated with congenital ocular defects, such as a weak sclera, which is prone to stretch. The future of such cases depends entirely on the mode of individual handling, because such changes are permanent tissue defects which can never be altered by medicine or surgery. It is surprising how children with 20/100 vision get along with a fair degree of side vision. This is due to the cerebral adaptation in forming a composite picture of what is seen. By this I mean that these eyes usually have a constant movement (nystagmus) which rapidly covers the area to be seen and in this way forms a composite picture rather than a photographic image. If such central vision be below 20/70, reading of the ordinary type is impossible. These children should have their defects clearly tabulated by an oculist, the best possible glasses prescribed, and an exact routine outlined for each individual. A thorough physical examination may lead to a contributing cause such as a vitamin deficiency, lack of calcium or thyroid. Such children should at once be encouraged to develop manual dexterity, use the typewriter, and possibly Braille. This relieves the eyes of the greatest stress and enables them to orient themselves by their other senses, using vision as an adjunct to enable them to get about. If this is conscientiously followed,

fully 90 per cent of such cases would remain unprogressive and retain the little vision that they have, to lead happy and useful lives.

The tragic individuals are not those who have lost their vision, for nature resigns them, but those who are gradually losing what little is left, who fear the day when vision will be gone. I know of no greater compensation than to feel that one has been responsible for keeping that small candle flickering in a dark world.

Virginia's Program of Prevention of Blindness*

Helen B. Jones

WE present here another in the series of articles describing what various states are doing to conserve vision. The programs of other states will be outlined in future issues

THE program for the prevention of blindness and the conservation of vision in Virginia does not differ greatly from any other well-rounded program being carried on in a number of other states. While our aspirations have been high and our plans diversified and extensive, the very limited finances of the Virginia Commission for the Blind have necessarily hampered and curtailed the work we have mapped out. However, in spite of our own particular handicaps and those common to other organizations engaged in the same activities, the scope of our work has been state-wide, and meritorious results have been accomplished.

The first problem which confronts us in carrying out our program is one common to all such groups—that of ascertaining what children and adults are in need of eye medical attention. This we accomplish through our contacts with doctors, school and public health nurses, civic and religious organizations and public and private schools. After those needing eye medical care have been located, our field nurse makes arrangements with recognized ophthalmologists to hold eye clinics at which time examinations and refractions are made. These clinics are held only for those who would not be able to procure and pay for this service. When glasses are prescribed, if the family cannot finance the outlay, they are provided by some civic or religious organization in the community. In a state such as ours—predominantly rural—

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conducting these refraction clinics is a tremendous undertaking. However, with the generous co-operation of ophthalmologists throughout the state, we are able to accomplish the maximum of results with the minimum of expense. Last year we held 21 clinics, examined 2,455 persons and refracted 231.

There is a considerable amount of trachoma in certain sections of Virginia and for the past three and a half years we have been holding trachoma clinics at regular intervals in Piney Glade district in Wythe County. This is a small community in the Blue Ridge Mountains, comprising less than ten square miles in area, in which we found sixty persons suffering from the disease. Here a most marked improvement has been made and many saved from total blindness through the efforts of the doctors who administered treatment and the nurses who taught these people the necessity of sanitation and the importance of diet.

One phase of our work, I believe, differs sharply in some respects from similar work in the country in the way in which it is financed. I refer to the organization, maintenance, and supervision of sight-saving classes in the public schools. Since the state makes education compulsory, provisions are made for the visually handicapped. All sight-saving classes in Virginia are handled by the Virginia Commission for the Blind in co-operation with local school authorities. Its part is to provide a full-time supervisor and pay one-half of each teacher's salary, while the school furnishes supplies and equipment and assumes the other half of the teacher's salary.

The problem which confronts educators dealing with children with seriously defective vision—yet not blind—is to make possible an education for those who possess too little vision to profit by the traditional school procedure and those who, because of progressive eye difficulties, would jeopardize their health and their sight by being forced to meet the same standards and use the same equipment as the unhandicapped child.

To provide schooling for those children, Virginia has established sight-saving classes the aims of which are threefold: first, to educate pupils with the least possible eye use; second, to teach them to conserve the vision they possess; and third, to give them some vocational guidance in order that they may later select occupations that will not jeopardize their sight. The first grade class

was organized September 9, 1926, in Richmond and the following fall a class was opened in one of the high schools. September, 1928, saw the establishment of two additional classes in the state, a junior high school class in Richmond and a grade class in Roanoke. The fifth class was opened in one of the Norfolk grade schools in 1929. While we justly feel a sense of gratification for what has already been accomplished toward conservation of vision and improvement of scholarship and mental attitudes, we realize that only a beginning has been made. It is estimated that about one in five hundred of the school population has too much vision to enter a school for the blind, but has some defect of sight which seriously handicaps him in the regular school work. Figuring on that basis, we find that Virginia needs to organize eighty-five classes for white children and thirty-six for colored. Even this number would not adequately meet the present need, for the figures which we have quoted include only those children in public schools. It is apparent that if we were to include the population of all private and parochial schools, the numbers would be materially increased.

Solving the problem of the visually handicapped child residing in rural communities and small villages is even more difficult than in cities. We are helping these children scattered throughout the state whose homes are inaccessible to a sight-saving center. Although our efforts to aid them fall short of what we would desire, we are furnishing Clear Type books and sight-saving paper, and are working with the regular teachers to secure as much special attention for the child as possible, advising them as to the most beneficial way of caring for such pupils.

Besides the number of public school children still unprovided for and those with impaired vision attending parochial and private institutions, special mention should be made of those children with partial sight who are now enrolled in the residential schools for the blind. It is our hope that as soon as possible facilities will be provided so that these children may be placed in conservation of vision classes where every consideration is given the care of their eyes and yet where their education is visual rather than tactual.

A very important phase of sight-saving work is the method of detecting and selecting pupils who require the benefit of these classes. At the present time candidates for sight-saving classes

are discovered by the regular classroom teacher; by city and county school nurses; or by an oculist in his private or clinic practice.

To one experienced in work with visually handicapped children, the need for a satisfactory method of testing the mentality of prospective members of a class looms up as a most important problem. It is assumed that all children assigned to a sight-saving class have normal mentality, but the most conscientious and experienced person has difficulty in determining whether the child's sense of inferiority, timidity, and retardation is due to poor vision or to a subnormal mental condition. A method of ascertaining this accurately is of paramount importance if the high standard of the classes is to be maintained.

Although special attention is naturally given to the physical environment of the partially seeing child, ideal conditions for him should be the same as for any other child. Too little attention has been given in the past to adequate natural and artificial lighting and elimination of glare, in all classrooms; and one of the worthwhile accomplishments of sight-saving classes in Virginia as well as in other states is making teachers and those interested in educational work "eye conscious." This added emphasis will undoubtedly have far-reaching results in minimizing the number needing this special type of instruction.

Just as the ideal physical surroundings should be the same for the child with normal sight as the one with impaired vision, the same educational standards and same curricula apply to both groups, with the exception that in the sight-saving classes changes are made in the method of instruction in those subjects that may otherwise prove harmful to defective eyes. The principal differentiation between the two groups is that in sight-saving classes more attention is given to eye care, and special equipment is provided, such as books in large, clear type, heavy soft lead pencils, maps without detail, unglazed paper with wide ruling, typewriters in large type and other material usable or adaptable for use by subnormal eyes.

Since sight conservation is the primary objective of these special classes, it is gratifying to know that four and one-half per cent of sight-saving class children return to regular grades after eyestrain or

other eye difficulty has been relieved by special care for a time. In the existing classes in Virginia we find in the records of the past year that the eye conditions of forty children remained the same and in seventeen they showed improvement, while in only three did the condition progress. This is undoubtedly due to our insistence in this state that every child have at least one examination annually and children with progressive conditions an examination twice a year.

As is usually the case, teachers in Virginia are recruited from the regular grades and must be highly recommended for the work. It is our policy to train them in the classroom and after they have had two years' experience to urge them to take the special summer training course including lectures on administration and methods of teaching sight-saving classes, anatomy, physiology and hygiene of the eye, and observation in a demonstration class and in an eye clinic. We feel that after a teacher has worked in a class previously to taking this course, she has a background for the special work she is to take up and is better able to appreciate, absorb, and evaluate the suggestions and knowledge which are afforded her. Three of our teachers have already taken the course at Columbia University and the other two have signified their intention of doing so next summer.

The per capita cost of these classes averages between $200 and $225 a year. This is not high in comparison with other special classes, nor is it high when we consider that the establishment of these classes has meant the prevention of ultimate blindness in some, and improved vision in others; the promotion of better scholarship; and the economic saving of assuring to society a life of independent usefulness.

The maximum enrollment in sight-saving classes tends to vary in different states, but in Virginia we limit the number to twelve. When we consider that an average of seven grades is taught in a class and the amount of individual instruction necessary, it is our opinion that this is as heavy a load as one teacher can efficiently carry.

Although only a very few cities have provision in vocational junior high schools for sight-saving class children, we are striving to include this form of training in our program. While we

do little more than suggest possible occupations which would be suitable for our students, we hope that the instruction we have given them in conservation of sight while they were members of our classes will carry over and guide them in choosing wisely after they leave school and enter the business world.

I have confined myself chiefly in this paper to a discussion of what is being done in Virginia to prevent blindness among children of school age and have touched but briefly on the conservation of vision program in relation to persons of more mature years. I do not feel, however, that I should bring this to a close without emphasizing the fact that Virginia early joined forces with those states agitating the eradication of ophthalmia neonatorum. In 1918 the legislature passed a clear and concise law requiring the use of silver nitrate in the eyes of the newborn; since that time this law has been enforced with such vigilance that the number of cases of blindness from this cause has been greatly reduced.

Why Wear Glasses?*

Philip A. Halper, M.D., F.A.C.S.

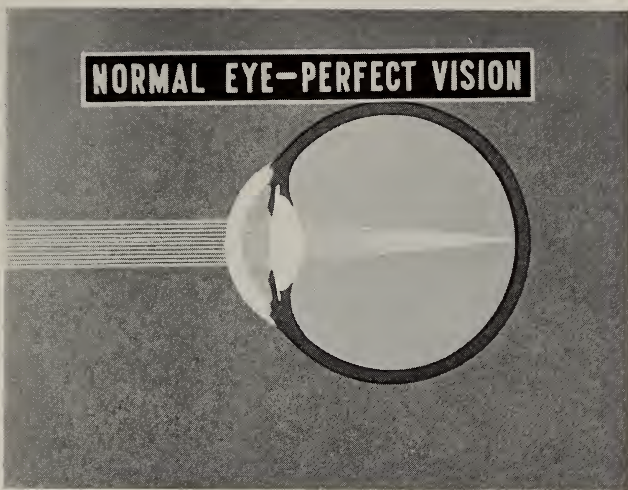
SPECTACLES should be worn to correct refractive errors; to improve muscle imbalance; to relieve whatever ocular symptoms are present. The prescription of glasses, however, does not mean that they must be worn indefinitely or permanently; the eye condition may change, and requires periodic examinations

OUR most cherished sense organ is the eye. Through it we develop adaptability to our environment and satisfaction of our inner capacities for comprehension. The uses to which the race puts the eye are variable: the savage uses his eyes primarily for the hunt and self-protection; the laborer to gain his wage so that he may feed and clothe himself sufficiently; the artisan to pursue his craft and in a measure to enjoy his relationship to his surroundings; the artist and sculptor in order that he may put on canvas or chisel out of granite and marble his interpretations of the splendors of Nature that his vision brings to him. Thus, in the scale of human life from the lowliest savage to the most cultured and advanced urbanite of today we find uses for the eyes that incorporate all the needs of man, from that of obtaining food to the inner responses to science, literature and art.

Strange as it might seem, this most vital sense organ, the eye, is grossly misunderstood and neglected. Though Nature overcompensates in some ways by making it possible to carry on when internal organs are deranged, she is very exacting about the eye; and every defect in vision is a definite and distinct loss for which there is no compensation. Because of this fact and because the use of eyeglasses has become so important to so many in bringing about the best use of the eyes, the topic, "Why Wear Glasses?", is of universal interest.

* Illustrations, courtesy of the Eastman Teaching Films, Inc.

There are three types of refractive errors which require correction with glasses, namely, farsightedness (hyperopia), nearsightedness (myopia) and astigmatism. Since the farsighted eye must exert considerable accommodation effort in order to see near-by objects, one readily appreciates the reason for eyestrain in hyperopes. The

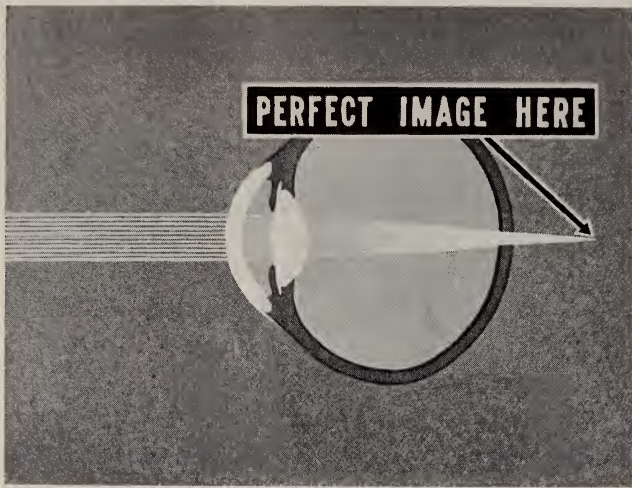


Normal eye—rays focus correctly on retina

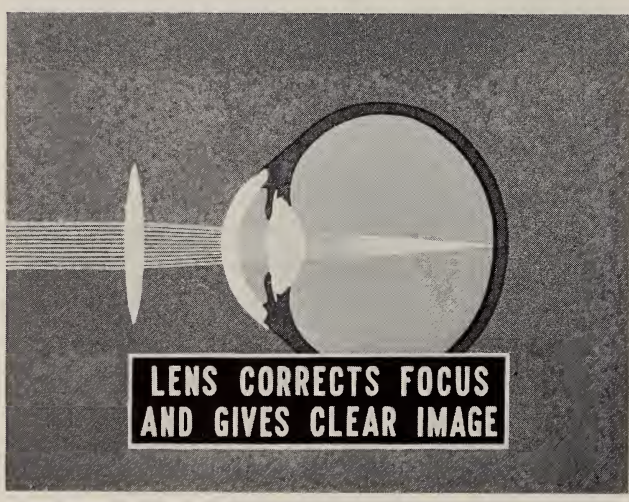
school day, with its attendant demands on the child's eyes, adds greatly to his burden, and home work to such children is an added strain. The nearsighted person, on the other hand, sees poorly in the distance and has a very weak accommodation mechanism. As a rule he sees well for near objects and presents no symptoms. Practically every eye has some astigmatism, a defect in the vision due to irregularities in the curvatures of the cornea and lens in their various meridia. In the otherwise normal eye which is neither farsighted nor nearsighted, a small amount of astigmatism produces no symptoms. Only when there is another refractive error present, or when the astigmatism is of a moderately large amount, does the latter condition become troublesome. It is known that astigmatism is constantly changing and hence the need of repeated examinations when one is aware of its presence.

In order to determine the exact refractive error, especially in

children and young adults, the eyes should be examined in a state of complete rest and relaxation so that accommodation effort may



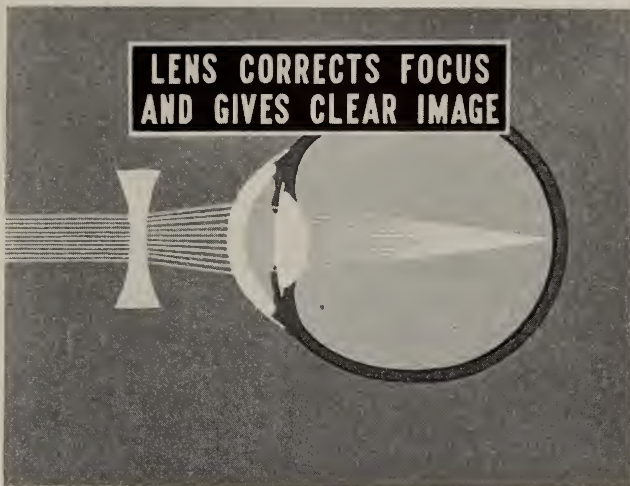
Farsighted eye—blurred vision



Farsighted eye corrected by converging lens—clear vision

not influence the result. For this purpose the eye specialist uses drops which prevent accommodation and enable him to obtain the exact findings.

Besides the refractive errors, there are other conditions which require the use of glasses. These cases fall into the group which have so-called "muscle imbalance." The muscles which are attached to the eyeballs and which move them in the various directions do not always have the normal relationships in their action



Nearsighted eye corrected by diverging lens—clear vision

and often a pair of muscles is either too weak or too strong. Cross-eyes may even result from such a situation. In looking at a distant object the eyes have a tendency to turn outward (the primary position of the eyes in the lower forms of life), and when looking at a near-by object the eyes converge. One can readily understand how multitudinous symptoms arise from abnormal muscle balance. If the muscles which turn the eyes inward are quite weak, the individual will be forced to exert considerable muscle strain in doing close work, since the eyes have a natural tendency to spread apart and he will be constantly pulling them in. When the muscle imbalance is of such a degree that one is unable with his own effort to overcome the difficulty, cross-eyes result. In prescribing glasses the muscle balance should always be considered, and the final correction may even rest entirely on that one factor.

When man approaches the middle years of life, the ability to focus begins to lag and a glass is a necessary adjunct to the eye

for reading and close work. The double glass, or bifocal, has been a fortunate advance since it enables one to see in the distance and at close range with the same pair of glasses.

Spectacles should serve the purpose for which they are intended, namely, to relieve ocular symptoms and to enable the wearer to see better. They should fit his face so as to be as inconspicuous as possible, for no one really looks better with a glass, despite the fad among young people of wearing oxford glasses. Lorgnettes have yet to make their appearance on American streets, though it is no uncommon sight in Europe to see even children using them when on a window shopping tour. A glass should be worn only when indicated. Frequently eyes develop symptoms when one is under severe mental and physical strain, or after an exhausting illness. When a glass is prescribed at such a time it does not mean that the glass is to be worn indefinitely or permanently. Perhaps after several months have elapsed the individual has so recovered as to make the same glass a handicap rather than a necessity. Often a patient is seen wearing the same glass for several years, long after the eye condition has either corrected itself or after the eyes have sufficiently changed to require a different correction. The abuse to which such eyes are subjected in being forced constantly to see through glasses which are either not required or which should be changed is inexcusable. These remarks are not intended to frighten people into the idea that glasses must be changed every six months; the doctor on prescribing the glasses will know according to the type of correction when the eyes should be examined again. A conscientious eye specialist finds a keen delight in taking glasses away from people where they are not absolutely indicated even though they may have worn glasses for years.

Aside from the fact that man needs glasses because of the demands which civilization places upon him, such as constant use of the eyes for close work, abnormal illumination in shops, schools, homes, etc., there are times when he should wear them for protection. This latter fact is especially significant for those who have only one good seeing eye, if the other has been lost entirely through accident or disease, or does not see though from all appearances it shows no gross pathology. Such an individual should wear a glass when fishing, for in casting the hook may easily catch an eye

and destroy it. In windy weather, when considerable dust is blown about, the possibilities of foreign bodies becoming imbedded in the cornea, resulting in infection and scars, should be borne in mind.

In this age of automobiles, many eyes are destroyed by broken and flying glass; especially is this risk great for the driver and the person sitting in the front seat of a car. Glasses worn merely for protection will save many of these eyes and this is a doubly important safeguard when an individual has only one good seeing eye. Non-shatterable glass in automobiles does help to eliminate this danger, but until non-shatterable glass is universally used and we learn that profits, no matter how great, can never compensate for the loss of sight, we must continue to avoid those hazards that deprive us of our most vital sense organs. Should we also find ourselves so engrossed in dangerous sports that we cannot give them up and at the same time protect our eyes, we must be courageous enough when calamity befalls us to face the future deprived of our greatest asset—our eyes.

Editorials

The Gift of Sight

IN SPITE of the hurried and often harried tempo of life in these troublous times, the approach of the Christmas Season cannot but quicken the hearts and senses of the most mundane. The shining light in the eyes of the children singing about the festive tree; the soft flicker of altar candles in the quiet solemnity of the midnight service; the warm glow of flames leaping over the traditional plum pudding, reflected on the faces of a reunited family—must emphasize anew the Christmas message of "Peace on earth; good will toward men."

Yet, with the refrain of peace and good will still ringing through the night, loving parents and doting uncles are giving children guns—real and sham—cannons, darts, arrows, shooters, and, in some parts of the country, firecrackers and fireworks, to add to the expression of Christmas feeling. Each year some seventy children enter schools for the blind because an accident with a shooter, a BB gun, a dart, or a firecracker cost them their sight. How many others carry some lifelong disfigurement because an unthinking adult placed in the hands of a child a hazardous plaything?

In less civilized times, when danger from beasts and human enemies lurked behind every bush, guns, darts and arrows were necessary weapons of defense and protection; children were taught to use weapons skillfully and with discretion. Today, such weapons in the guise of toys add, without cause, to the multitudinous hazards of our civilization; their use is antisocial and destructive.

Those of us who are engaged in the work of preventing all unnecessary blindness must continue to protest against this exploitation of children's play and to further public education against the sale of hazardous toys. We who have seen—in clinics, in physicians' offices, in schools for the blind, and in sight conserva-

tion classes—the pathetic results of thoughtlessly chosen toys, cannot neglect this project in our other efforts to save sight.

What Price Eye Beauty?

To the list of causes of blindness is added a new one, recently disclosed. Thousands of women and girls have been coloring their eyebrows and eyelashes. Already one instance of virtual blindness and a number of cases of serious eye injuries have come to light.

It seems almost unnecessary to call attention to the danger of using powerful chemicals close to the eye, yet the urge for personal beauty is often so great that better judgment is sacrificed to vanity. The woman who is shopping for beauty can scarcely be expected to know about the chemistry, or the contents, of the cosmetics she is using. Her friends have their eyelashes dyed—and nothing happens to them. Thus, she is unaware of any danger in the practice. Much depends on the particular dye used and the particular woman whose lashes are being dyed; some women have a greater susceptibility to dyes than others.

The *Journal of the American Medical Association*, in a recent editorial, commented: "Every physician, and practically every responsible beauty parlor, knows the risk that is run in the application of dyes of the aniline type to the hair of the scalp. It has long been good beauty parlor practice to insist that persons who are to be subjected to an aniline hair dye should be tested for sensitivity to that product. Because of the irritating effects of such dyes, there is no justification for the use of so dangerous a substance around the delicate tissues of the eye."

Since there is no way for the average person to know what is safe, the public should be protected. We have laws to protect us from poisonous foods and dangerous drugs. At the present time, moreover, federal authorities are considering the Tugwell Bill, to strengthen such regulations and to include control of cosmetics. Without expressing approval of the detailed provisions of this bill, we do approve most heartily any legal safeguard from the menace to eyesight which may be present in harmful dyes.

"The loss of even one person's eyesight," says W. G. Campbell, Chief of the Federal Food and Drug Administration, "is such a

terrible thing that we can offer no excuse for not putting the public on guard against a sight destroyer . . . . It is unfair to the ethical and careful manufacturers of cosmetics to force them to suffer an impairment of public confidence which the operations of a few careless, brutal, or unscrupulous manufacturers occasion by their reckless distribution of highly toxic substances."

The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request.

The Eyes in Infancy and Childhood*

The development of the special senses in infants and the care of the special organs connected with them are of interest to all mothers.

Sight is the most precious sense we possess; therefore the eyes should receive just the right care from the moment the newborn baby enters the world. Thousands of babies have become blind because proper precautions were not taken to protect their eyes when they were born.

As soon as the baby is born his eyes should be carefully wiped with sterile absorbent cotton prepared before birth, a separate piece of cotton being used for each eye, and the wiping should be done from the nose outward without opening the eyelids. All mucus, blood, etc., will thus be promptly removed from the outside of the eyes.

The inside of the eyes should next be promptly attended to by the doctor in charge. Usually he will provide a one per cent solution of silver nitrate, put up in ampules for the purpose, but it is wise for the mother to have this solution at hand also, in case of urgent need. Two drops of this solution are put into each eye of the baby, the lids being carefully opened so that the drops will surely get inside of each eye.

* Reprinted from the October, 1933, *Pictorial Review*, in which it appeared as "Baby's Special Senses: Sight."

Some doctors prefer another form of silver, but this must be left to individual judgment. Others like to put some normal saline solution drops into the eyes after the silver nitrate has been used.

Infection of the eyes of a newborn baby is one of the most serious maladies that can happen to him. If this takes place the mother should not lose a moment in placing the child in the hands of a skilled doctor. The sight may be saved or lost according to the promptness with which the right treatment is begun. In most states it is required that eye infection shall be reported to the board of health, just as any other infectious disease.

The above-mentioned care having been given the eyes of the infant, he should be placed in a semidarkened room and not be made to bear the glare of an electric light or that of the sun directly in his face until his eyes become a little stronger. During his first few weeks of life the baby shows that too bright a light is very unpleasant; his eyes will often close if he is so subjected. A subdued color for a nursery wall is better for his eyes than plain, glaring white.

As early as the sixth day the baby may follow a bright light in the room with his eyes, showing he is conscious of its presence. The muscles of the eyes of the newborn do not act in harmony, but are irregular. Co-ordinate action is not established until about the end of the third month, but after this time inco-ordinate action is sometimes seen. The baby may look "cross-eyed," as mothers say, on this account. Be careful not to make this condition worse by standing behind him or by dangling toys above his head.

Babies sometimes sleep with their eyes partly open because the eyelids move irregularly, not being yet under full control.

Between the third and fourth months a baby will usually recognize his bottle or a familiar person, showing that he really sees and understands what he is looking at.

It once was part of the regular morning toilet to wash out the baby's eyes with a solution of boric acid, one teaspoonful of the boric acid powder to one pint of sterile water. This is still advocated by some doctors, but others claim that the tears are enough to flush out the eyes.

However, as tears are usually not seen until the third month, or a little later, it seems to me, if carefully done, washing out the eyes

with sterile water or the boric acid solution is just a little wiser from the standpoint of cleanliness. Always use a separate piece of cotton for each eye, and bathe from the nose outward. Burn the cotton afterwards, of course.

The age at which the color of the eyes becomes permanent is often asked. This varies considerably in different cases, but most often by the time the baby is six months of age one can tell whether his eyes are to be blue or brown. There is no really set age, however, when the eyes remain a certain color.

Mothers often worry because little clots of mucus, sometimes even a little pus, gather in the corners of a baby's eyes, especially in the early morning. Sometimes this means that the small tear duct is not well opened, so that mucus can run through it. If, after carefully bathing the eyes every morning with the above-mentioned boric acid solution, this condition still remains, it is best to consult an eye specialist.

He may give special drops and teach the mother how to massage the parts surrounding the eyes so that the ducts will open. It is seldom necessary to do more than this, although the condition may persist for some time. Probing the tiny tear ducts is not often advocated, and not until all other treatment has been tried and has proved a failure.

Pink eye is quite infectious, and will easily pass on from one member of the family to another. It is most important, therefore, that each member of the family have his own wash cloth and towel, his own handkerchiefs, and all his own clothing, and that he does not lend any of his articles for the baby's use, as babies are quite susceptible to all infections of this nature. Soft cheesecloth wash cloths that can be easily boiled and frequently renewed are the best material for a young baby's use, one cloth being kept for the face only, while another is used for the body.

Sties, granulated lids, or any other abnormal eye condition should be very promptly reported to the family doctor, because early treatment is required and may prevent a more serious condition from developing later on.

As the baby grows older and begins to like picture and story books, care should be taken to see that he has a good light, does

not try to read by a flickering firelight or a dim twilight, or be too far away from a reading light, which should be of the proper type.

If it is noticed that he squints, holds his book too far or too near his eyes, he should at once be taken for an eye examination by a reliable doctor. All children should have an eye test before they enter school. Children are often considered backward simply because they cannot see the blackboard well, whereas correct eyeglasses are all that is needed in many cases.

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Routine Wassermann Test for All Expectant Mothers*

Surprisingly great is the variety in the reported statistics concerning the prevalence of syphilis in different countries and under different social conditions. Pregnant women show prodigious variation in this regard. For example, Dr. Goldberg, of the New York Tuberculosis and Health Association, has collected figures from a wide variety of sources in this country. The highest incidence is reported from Birmingham, Ala., where among 629 colored women 24.8 per cent were infected, approximately 1 in 4. In the same community only 8.7 per cent among 116 white women were infected, approximately 1 in 12. These are health department statistics and probably are weighted with a number of indigent and casual individuals. The Chicago Lying-In Hospital where the patients are mostly white has 2.6 per cent incidence of positive Wassermanns among 6,954 obstetric patients, while the Sloane Hospital here reports 3.6 per cent positive Wassermanns among 9,955 women. These again are mostly white. In comparison with these figures it would be interesting to quote the percentage of positive Wassermanns on pregnant women found in the different hospitals of Greater New York. Let me select a few. Harlem Hospital, with a great preponderance of Negroes, shows 15 per cent positive Wassermanns during the past five years. Lying-In Hospital shows 2.5 per cent of whites and 12 per cent of Negroes. The other hos-

* Read (by invitation) at a meeting of the New York Obstetrical Society, February 14, 1933, under the title, "The Importance of Establishing a Conditioned Reflex 'Pregnancy-Syphilis' in the Minds of the Medical Profession," and reprinted from *American Journal of Obstetrics and Gynecology*, Vol. XXVI, No. 1, July, 1933.

pitals, not separating the Negroes from the whites, vary to an extraordinary degree. The Berwind Maternity Clinic reports 12 per cent positives on 367 pregnant women; the Long Island College Hospital, 6 per cent on 1,200; the Coney Island Hospital, 5 per cent on 4,746; the Nursery and Child's, 3 per cent on 1,119. In contrast, hospitals with a preponderance of private patients show extremely low incidence of positive Wassermanns. Thus the United Israel Zion Hospital of Brooklyn reports 0.3 per cent on 1,477 obstetric patients. The Jamaica Hospital reports 0.2 per cent on 635.

Anyone with medical experience realizes that the spirochete is no respecter of persons. The rich become syphilitic as well as the poor but they are, on the whole, better treated and more likely to reach the obstetric clinic at a time when the Wassermann is negative. This has encouraged many hospitals of this city to omit Wassermanns or corresponding serologic tests for private patients. The obstetrician who brings in a private patient is permitted to elect whether or not that patient shall be tested for syphilis.

Now I am not an obstetrician; I am not a gynecologist; I am not a syphilologist. My interest in the prevention of venereal diseases is my excuse for appearing here tonight, representing the social hygiene committee of the New York Tuberculosis and Health Association. What I hope to impress upon you is the importance of establishing a conditioned reflex, pregnancy-syphilis, in the minds of the medical profession.

Three things are perfectly well known to me and doubtless to all of you. Syphilis, unlike gonorrhea, can almost always be so treated during the course of pregnancy that the child will not be infected. The figures of Laurent are well known: 563 untreated syphilitic pregnancies left only 26.5 per cent of infants alive at the age of three months, while the same women subsequently treated for syphilis during 161 pregnancies had 91.9 per cent youngsters alive at three months. McCord at his famous Atlanta clinic, chiefly among Negroes, reduced the stillbirths from 70 per cent to 5 per cent and increased the babies born alive from 30 per cent to 93 per cent. There is no need to multiply statistics further.

Further, syphilis, like gonorrhea, is extremely difficult to diagnose during the course of a pregnancy. Indeed we may stress the

point and say that to judge from animal experiments as well as from the phenomena of human disease, pregnancy inhibits the symptoms and lesions of syphilis.

Most of you have not lived long enough to remember that at the beginning of this century there were three kinds of congenital syphilis: paternal syphilis, maternal syphilis, and syphilis inherited from both parents. Before the Wassermann reaction came along to wipe out this beautiful theory, one of the most distinguished German syphilologists had written a book crammed full of cases illustrating the successful treatment of hereditary syphilis of paternal origin by antisyphilitic treatment of the father. Fournier had developed the beautiful theory of *choc en retour* to explain how tertiary lesions occurred after pregnancy in 60 per cent to 80 per cent of the non-syphilitic mothers who had borne syphilitic children to syphilitic fathers. This pretty theory was that these tertiary lesions were not due to the living infectious virus of syphilis (treponema being as yet undiscovered) but were due to a toxin absorbed during the nine months of pregnancy by the mother from her syphilitic child, herself thus immunized to the disease.

Reason staggered along under the weight of this theory until Wassermann and Ehrlich broke it up.

Now the excuse for venturing to summarize for you this quaint bit of medical history is because it is perhaps due to some residue of the habit resulting therefrom, that we today treat the possibility of syphilis in pregnancy with more levity than we do that of gonorrhea. To return to the proper title of this paper we must realize the importance of establishing a conditioned reflex, "Pregnancy-Syphilis," in the minds of the medical profession. Such reflex has been established as to "Pregnancy-Gonorrhea." No physician could omit to drop silver nitrate solution in the eyes of the newborn child. Yet any one of you who takes care of children is aware of lives mutilated or destroyed because a similar hard and fast rule has not been established in the minds of the medical profession with regard to syphilis. The poor are taken care of, for the routine of the clinic requires a serologic diagnosis of syphilis. The rich are not so fortunate. Let me add another phrase to your medical catchwords: "Because a woman can afford to pay for the treatment of a

syphilitic child is no reason why she should be permitted to have one."

Do not offer as an excuse your hesitation to mention syphilis to an uninformed woman. There is no need to mention it. A specimen of blood may be obtained on any one of a number of other assumptions.

In conclusion let me ask you, do you take this seriously? Do you think that a physician should be required to perform a serologic test for syphilis the moment a pregnant woman applies to him? I do, for, let me repeat:

Syphilis, like gonorrhea, is no respecter of classes. To fix that in your mind let me repeat the cynical aphorism of a French urologist, "No woman, however beautiful, can give what she has not got."

Syphilis may, like gonorrhea, be difficult of diagnosis at any time during its chronic course, but pregnancy renders syphilis particularly obscure by inhibiting its somatic lesions, leaving only the blood reactions of the disease as a means of diagnosis.

Syphilis, unlike gonorrhea, can be controlled during pregnancy by treatment.

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Prevention of Blindness as Carried On by Missouri Commission for the Blind*

The Missouri Commission for the Blind, created by Act of the General Assembly in 1915, is specifically enjoined to "adopt such measures as the Commission may deem expedient for the prevention and cure of blindness."

The importance of a strong prevention program was recognized early; little was done during the first ten years.

Prophylactic for Babies' Eyes.—During the first two years the need for general legislation for the protection of the eyes of newborn babies from ophthalmia neonatorum was brought to the attention of the State Board of Health. In 1921, because of the combined pressure of the Missouri Commission for the Blind, the State

* Read before the American Association of Workers for the Blind, Richmond, Va., June 26–30, 1933, and appearing as part of the published *Proceedings*.

Board of Health, Missouri School for the Blind, and interested physicians, a law was passed making mandatory the use of a prophylactic in the eyes of every newborn baby. The State Board of Health ruling is that 1 per cent nitrate of silver be the prophylactic used.

Examining Staff of Ophthalmologists.—An examining staff of ophthalmologists, located in various parts of the state, was appointed by the Commission in the early years, later reorganized, and the requirement set up that each member must hold a certificate of the American Board for Ophthalmic Examinations. The present staff consists of a medical director, Dr. Harvey J. Howard, an associate medical director, Dr. William M. James, both of St. Louis, and 52 other ophthalmologists who serve the Department for Prevention of Blindness absolutely without remuneration of any sort, from any source.

First Nurse Appointed.—In 1928 one full-time nurse was appointed. The director of nursing activities of the National Society for the Prevention of Blindness visited Missouri that year and remained six weeks to assist in developing a statewide program.

Department for Prevention of Blindness Organized.—In 1929 a separate department for prevention of blindness and conservation of vision was organized. Two graduate nurses with social service and medical social service training and experience, and one secretary constitute the present paid staff.

Objectives of the Department for Prevention of Blindness.—The objectives of the department include all activities which tend to promote and maintain eye health, to preserve or protect vision, to conserve limited vision, to facilitate the early discovery of persons having diseased eyes or limited vision, the provision of adequate diagnostic examinations and subsequent corrective or curative measures for the preservation or restoration of vision and eye health, and for adequate, continuous follow-up.

Promotion of Eye Health.—An educational program has been developed which includes lectures, exhibits, posters, radio talks, showing of films, publications as magazine articles in professional and lay magazines, and a news letter sent from the department, entitled "Out of Darkness With Proper Eye Care."

Courses on promotion of eye health in teacher training colleges, elementary and secondary schools, colleges, schools of nursing, of public health nursing, and of social service are being encouraged. Vision testing demonstrations are being given to groups of teachers, nurse students and graduates, and others.

Preservation and Protection of Vision.—Periodic vision tests, begun during the preschool years and continued at intervals throughout life, are being stressed; vision tests to be followed by eye examination by a competent eye physician when the need is indicated. The breaking down of the prejudice against the wearing of glasses, the practice of good posture, proper illumination, training in safe play practices and prevention of accidents, and protection of eyes in industrial occupations are other measures being emphasized.

Conservation of Vision.—The conservation of limited vision consists of developing sight-saving opportunities for partially seeing children, by providing adequate physical care and organizing sight-saving classes in schools. Some little has been accomplished, much remains to be done in Missouri. Five sight-saving classes in one city, one in another, serve a limited number of city children. Children of rural Missouri were served even less. A long stride forward was taken when in January, 1933, one hundred eighty-five volumes of thirty-eight different titles for the eight primary school grades were purchased by the Missouri Commission for the Blind and placed on the shelves of the Missouri Library Commission which circularizes books to all the rural areas of Missouri. In the first six weeks books were borrowed for children in ten (10) widely separated counties of the state.

Correction and Restoration of Vision.—Persons with eye difficulties, financially unable to care for themselves, from all save one of the one hundred fourteen counties of Missouri and all save one of the cities, are cared for by the Department for Prevention of Blindness of the Missouri Commission for the Blind, unless they have trachoma. The United States Public Health Service Trachoma Hospital, serving an area covering several states, is located in Missouri, consequently any and all trachoma cases are referred to that service. The Trachoma Service refers all Missouri cases

but trachoma to the Department for Prevention of Blindness. The St. Louis Society for the Blind cares for St. Louis and St. Louis County. Other organizations of many types, including the State Board of Health, County Public Health Departments, Public Health Nurses, social agencies, clubs, etc., likewise refer cases to the Department for Prevention of Blindness.

All applicants for the blind pension, who have a condition promising any improvement in vision, are referred to the Department for Prevention of Blindness for care.

All children seeming to be in need of sight-saving school helps or possibly admission to the Missouri School for the Blind, are referred by all departments of the Commission to the Department for Prevention of Blindness for examination, diagnosis and recommendations for education as seeing or blind individuals.

Rural Clinics.—Missouri is essentially a rural state, having only six cities of thirty thousand or more inhabitants. The majority of the ophthalmologists are located in the larger cities, leaving the vast rural population without opportunities for competent eye care. To provide for this need the Department for Prevention of Blindness, on request from local organizations, the Medical Society, or individual doctors in the county when no organization of doctors exists, holds rural diagnostic eye clinics at which members of the examining staff of ophthalmologists make the examinations, diagnoses, and recommendations for care. Nurse social workers, members of the Department for Prevention of Blindness staff, make the preliminary arrangements, take care of the necessary publicity, inspect suggested locations as the court house, a church, school or hall, assist with the examinations and interpret the recommendations to the patients before they leave.

A social history and a medical eye history are secured, the complete records taken back to headquarters, all new cases opened in the files, and every case followed up immediately by letter, further follow-up being based on the needs of individual cases varying from reinterpretation of recommendations to hospitalization, operation, after-care and long time follow-up for eye or constitutional treatment for conditions affecting eyes.

The members of the ophthalmological staff operate and care for patients without charge; the hospitals in the state have given the

Department for Prevention of Blindness special reduced rates, as have the optical shops.

Persons from as many as 13 counties have come in to one clinic; as many as 436 persons have reported for examination on one day.

Fifty-one clinics have been held in the three years since this service was instituted.

Four thousand, nine hundred and ninety persons have been examined at clinics.

June 1, 1933, 4,067 active cases were being carried from the central office, and 1,058 inactive cases, making a total of 5,125 cases.

Given an adequate personnel and budget for the development of the above program, the possibilities for constructive work in promotion of eye health, preservation, conservation, and restoration of vision, and actual prevention of blindness are unlimited.

Mary E. Ryder, Executive Director,
Missouri Commission for the Blind.

Note and Comment

Annual Meeting.—The National Society for the Prevention of Blindness held its annual meeting on November 24 in New York City. Following the reports of the president, Mr. William Fellowes Morgan, and of the managing director, was the interesting talk on "Light and Vision" given by Mr. Preston S. Millar, president of the Electrical Testing Laboratories, and director of the Society. The importance of adequate illumination, means of obviating glare, color of light and the response of the human eye to these important factors in lighting, were demonstrated by concrete illustrations and experiments. The application of these experiments to the work of the Society in conserving sight was brought out by Mr. Millar's talk.

Although the usual conference of the National Society was limited, for reasons of economy, to round-table discussions, a luncheon meeting, given with the co-operation of the North Atlantic District of the American Association of Hospital Social Workers, the Medical Social Service Section of the Welfare Council of New York City, and the Department for Prevention of Blindness of the New York State Commission for the Blind, was called on November 25 to discuss medical social eye service in relation to the community. Dr. Ellice M. Alger presided; speakers included Miss Ruth E. Lewis, associate director of social service, Washington University Clinics and Allied Hospitals; Dr. John M. Wheeler, director of the Institute of Ophthalmology, Columbia University Medical Center; and Mrs. Francis W. Little, executive secretary of the Maryland Society for the Prevention of Blindness. Practical possibilities for medical social work in eye clinics through community organizations were outlined by Miss Ruth B. McCoy, R.N., of the New York State Commission for the Blind; by Miss Sophie M. Cunningham, speaking for the Welfare Council; and by Miss Eleanor P. Brown, of the National Society for the Prevention of Blindness.

Eye Beauty—or Eye Poison?—What chances do women—and usually young women—take when they attempt to beautify their

eyes with eyelash dyes, eyelash curling fluids, or eye drops? After several reports of damage done by such eye beautifiers, the Board of Medical Examiners of the State of California declares: "It is a serious thing for anyone to use a solution of unknown content around the eyes. Some of them contain analine derivatives, and may either cause blindness or serious dermatitis." The *Journal of the American Medical Association* has records of at least 16 cases of dermatoconjunctivitis following the use of Lash-Lure, an eyelash dye. One of these cases may progress to blindness. These recorded incidents add dramatically to the pressure now being exerted to obtain federal control of cosmetics, through an act similar to that now in force for food and drugs.

From an abstract appearing in the *British Medical Journal* for October 21, it is apparent that this eye danger is not confined to the United States. A physician writing in a German medical journal on July 7 notes that henna, used commonly for hair dye, has recently become popular for darkening the eyebrows and eyelashes, and within four years he has seen six cases of severe conjunctivitis resulting from this practice. Two patients developed keratitis, one with ulceration. The author concludes that application of henna to the eyelashes is not so free from danger as has hitherto been supposed.

A timely step taken by the Board of Health of New York City was the recent amending of the Sanitary Code, prohibiting the manufacture, sale or use in beauty parlors, of the several different eyebrow and eyelash dyes which contain analine derivatives. "The use of these preparations in such close proximity to the eyes is particularly dangerous," warns New York's health commissioner, Dr. Shirley W. Wynne. New York is the first city in the country to force action in thus protecting the eyesight of its women citizens, and anticipates the steps now being taken in Washington to amend the Federal Food and Drug Act.

Eye Gnat Causing Seasonal Conjunctivitis in South.—In an investigation of some cases of trachoma in Georgia, a seasonal acute conjunctivitis, locally known as "gnat sore eyes," was noted by the United States Public Health Service. Its incidence seems to be greatest among young children. The disease, which is epidemic in

Georgia from early summer to the end of fall, has also been noted in southern California. Control measures consist of treatment in the schools and homes, and teaching of personal hygiene, combined with eradication of the breeding places of the gnats.

Schools for the Blind Face Similar Problems.—For whom are the schools for the blind intended? ask both the Perkins Institution and Massachusetts School for the Blind and the Western Pennsylvania School for the Blind, in their annual reports for the year. Both schools labor under the handicap of having committed to them blind children of uneducable mentality and children with sufficient sight to obtain education in sight-saving classes, were such classes available. Neither group should rightfully take up limited places intended for the educable blind child. Perkins Institution's director sums up the situation and its answer: "To fulfill our trust, and to maintain our standards as a school, we must insist that applicants for admission have sufficient mentality to be 'educable,' and insufficient sight to use their eyes for purposes of education."

National Negro Health Week.—Because of widespread unemployment among the people themselves, and because of threats of cutting health project budgets, the 1933 National Negro Health Week's slogan was "HEALTH FIRST—More than ever before, CARRY ON!" How this was accomplished, particularly during the week given over to special effort in this direction, is outlined in the April-June issue of *National Negro Health News*. Definite projects were undertaken in 25 states and 1,652 communities; educational health efforts resulted in distribution of literature, lectures, exhibits and clinics. The extension of this work to even greater numbers, with resulting improvement of living standards and health, is looked for in the future.

The School, First Defense Against the Spread of Trachoma.—Of the three methods of attack against trachoma in Tunisia—detection, treatment, and prophylactic education—the last named is most important in the eventual uprooting of the disease. It is among school children that trachoma most frequently is found, and it is among these children, regularly attending the same school, that treatment and education in hygienic measures may most

effectively be taught. Dr. Junès, writing on "The School and the Fight Against Trachoma," in a recent issue of the *Revue Internationale du Trachome*, believes that isolation of infected pupils is not necessary when schools have sufficient sanitary devices for washing. Not only will the school child, as a future citizen, grow up with an understanding of the value of and the necessity for care of such eye infections, but he will carry home immediately, more effectively than any other emissary, the lessons which he has learned in school in hygienic practices and healthful living.

Academy of Medicine Lists New York City Eye Clinics.—The Bureau of Clinical Information of the New York Academy of Medicine recently presented its bulletin of approved non-operative clinics. Those appearing under ophthalmology are:

Herman Knapp Memorial Eye Hospital; daily, 2.00 P.M. Dr. Arnold Knapp and staff.

Manhattan Eye, Ear and Throat Hospital; Drs. Lewis W. Crigler and David H. Webster, Monday, Wednesday and Friday, 2.00 P.M. Drs. N. De L. L. Fletcher and H. R. Skeel, Tuesday, Thursday and Saturday, 2.00 P.M.

Mount Sinai Hospital; Drs. Isadore Goldstein and Kaufman Schlivek, daily, 1.30 P.M.

Neurological Hospital; Dr. James W. Smith, Wednesday, 2.00 P.M.

N. Y. Eye and Ear Infirmary; daily, 2.00 P.M. Drs. F. W. Shine, Conrad Berens, Clyde E. McDannald, Ben Witt Key, Webb W. Weeks and Bernard Samuels.

Polyclinic Hospital; daily, 3.00 P.M. Drs. Ervin Torok, Monday, Wednesday and Friday, and C. E. McDannald, Tuesday, Thursday and Saturday.

Post-Graduate Hospital; Daily at 3.00 P.M. Monday and Friday, Dr. Ellice M. Alger. Tuesday and Thursday, Dr. Martin Cohen. Wednesday and Saturday, Dr. Manuel Troncoso.

Eye Defects Now Apparent at Earlier Age.—In a Somerset school in England it has been noticed that eye defects tend to show themselves at an earlier age than was the case ten years ago. It has been found that the number of eye defects found in children below the age of eight years is now treble the number found in this group ten years ago. This is thought to be because young children sleep less than formerly; and, further, it may be accounted for by the fact

that, whereas formerly young children learned to write with chalk at a blackboard, they are now using lead pencils on lined paper, causing too great eye fatigue for children who are farsighted.

Scholarship Improved by Light.—The direct benefits of good, controlled lighting have been studied for a period of three years in a school in Tuscumbia, Alabama, and, while many of the results are intangible, it has been concretely demonstrated that improved lighting lessens to a large extent school failures. In one sixth-grade schoolroom, a photoelectric ray automatically controlled the illumination during school hours. In a similarly situated sixth-grade classroom in the building, lighting was controlled by a hand switch. The three-year average shows that the first classroom was artificially illuminated one-third of the time, three times as often as the second, while its classroom failures were one-third as numerous as those of the class where the illumination was manually controlled and, in ratio to enrollment, were about a third that of the other class. Of equal importance was the teachers' testimony: "The children in room I (where the automatic lighting was used), were much more alert, cheerful and attentive, while those in room II seemed restless and sleepy on dark days and were harder to teach." Of practical interest is the cost of the extra illumination: the additional electricity used in room I averaged $24.33 a year; the annual cost of educating each pupil per year is $28. By preventing the failure of six pupils each year, this extra electricity earned $144.

This concrete evidence of the practical gains of good illumination was presented at the annual convention of the Illuminating Engineering Society, at Camp Illumination, Lake Delavan, Wisconsin, August 28–Sept. 1, by D. W. Atwater. Of equal interest was the talk given by M. Luckiesh and Frank K. Moss on "The Applied Science of Seeing," which reviewed the principles involved in improving lighting to improve sight.

Perfected Stereoscopic Test.—In 1903, before airplanes and air travel were more than ideas to conjure with, and when even automobile traffic brought out a curious throng, accurate measurement of stereoscopic vision was not as important as it is today. In 1903, Dr. F. H. Verhoeff, an ophthalmologist in Boston, arranged a test

not requiring depth discrimination, for the determination of stereoscopic vision. To this test he has recently added further refinements, based upon the perception of luster and upon the principle that when two disparate retinal images are made unequal in intensity, the position of the image resulting from their "fusion" is shifted toward the more intense image.

Presbyopia—A Life Expectancy Yardstick.—The amount of presbyopia in an individual may be a dependable indicator of life expectancy, according to Heinz Steinhaus, whose study of the relation of presbyopia and duration of life was discussed in a recent editorial in the *Journal of the American Medical Association.* Dr. Steinhaus believes that presbyopia in an individual, measured against the average amount of presbyopia for the age, will foretell the life expectancy of the body as a whole. This loss of accommodation for near vision presages the general senility of the body; when the amount of presbyopia is less than is usual for the age, an extension in life expectancy of as much as ten years may be promised. If, on the contrary, the presbyopia is above the amount expected at the age, it is significant of the fact that body degeneration is proceeding at a quicker pace than usual, and the outlook for a life span of the Biblical promise of "threescore and ten" is not hopeful. This information can be of little value to the patient, since promise of long life may be nullified by accident; certainly, to those with signs of early senility the knowledge is only worrisome. But for the purposes of determining life insurance risks in persons over forty years of age, this new index of life expectancy may have decided value.

Sight Conservation Loses Noted Friends.—The passing of Ernest E. Maddox, eminent British ophthalmologist, is noted with regret. Prevention of blindness workers and ophthalmologists all over the world, as well as in his own country, will feel his loss. Invention of the cheiroscope, a device for developing fusion in cross-eyed children, gave Dr. Maddox international fame and furnished impetus to this type of treatment here in America.

We share the sadness felt by all organizations for the blind and for the conservation of vision at the tragic death in a railroad accident of Pierre Villey, secretary general of the Valentin Haüy

Association. Dr. Villey was a student and a scholar whose book, *The World of the Blind*, interpreted the peculiar problems and compensations of the blind with sympathy as well as understanding.

Health Education for the Masses.—How health is demonstrated to large groups of people is the subject of the Milbank Memorial Fund's annual report. Appropriations have been made for the health demonstration in Ting Hsien, China, the Cattaraugus County (New York) demonstration, and local health demonstrations in New York City. The Fund has been concerned with the development of practical programs, the application of scientific knowledge in the administration of health and welfare, and improvement of administrative procedures. But, partly as a logical development from its experience, especially during the past decade, and partly because of the exigencies of a severe economic depression, the Fund has been influenced by a broader conception of what public health and social welfare mean. A concrete example of work which the Fund has aided financially is reported in "Education for Healthful Living in the Public Schools of Bellevue-Yorkville, 1927–1931," by Nina B. Lamkin, prepared under the direction of Savel Zimand, administrative director of the Bellevue-Yorkville Health Demonstration in New York City. The general objectives—co-operation in a health education program which would be an all-day influence; assistance to the classroom teacher in interpreting healthful living; assistance to teachers in evaluation of progress in teaching healthful living in terms of child growth and development—have been reached, as this report of methods shows.

Medical Social Work in England.—The growth of professional medical social work in eye clinics in this country leads to a natural interest in similar efforts being made by the British Prevention of Blindness Committee in the Ophthalmic Hospital Experimental Scheme, which is reported in the *British Journal of Ophthalmology* for August, by J. D. Magor Cardell. A voluntary worker with no previous ophthalmic training was placed in the out-patient department of the Central London Eye Hospital for three months, where she was instructed in the rudiments of eye diseases and methods of treatment. Dr. Cardell, who trained the worker and

made the experiment, found that with the services of this trained voluntary worker many causes for non- or irregular attendance at the clinic might be obviated by obtaining the co-operation of family or other agencies. He found, further, that continued treatment materially aided in producing successful outcome of the case; that, through the home visits of the voluntary worker, a greater understanding grew up between the physician and the patient, as well as the patient's family, resulting in recognition of the patient's problems on the doctor's part and in better carrying out of prescribed treatment on the part of the patient. The Prevention of Blindness Committee promises to aid other hospitals in planning a similar scheme for the better treatment of its eye patients.

Infected Eyes.—"How to put a value on a useful eye is unknown. It cannot be measured in dollars and cents either to the owner or to the public. Every eye that has pus between the lids is more dangerous than a rattlesnake, and it is up to the family physician and the oculist to do away with the danger." So concludes an editorial in the Wyoming Section of *Colorado Medicine* for November, calling attention of general practitioners to the great danger of eye infections not adequately treated.

Prevention of Blindness Propaganda Spreads in France.—The growing interest and enthusiasm in France for sight conservation measures are ably illustrated in the three publications, recently issued, on different aspects of prevention of blindness. "Five Lessons on the Prevention of Blindness in Childhood," issued by the Ophthalmic Clinic of the Hôtel-Dieu, in Paris, and the Child Hygiene Bureau (École de Puericulture), is a compilation of clinical material on eye diseases and disorders in childhood, presented in scientific, yet understandable, style for teachers and health officers, to whom the health of young children is entrusted. Responsibility for the conservation of vision, as part of general child hygiene, is placed upon the parents, the teachers and nurses, the physicians, and the social agencies.

Of different import, for a popular audience, is "Help Us Fight Trachoma," a bulletin published and circulated by the Bureau of Public Health in Morocco. Illustrated to show typical trachoma-

tous lesions, the text on trachoma pathology is simple and concise. More dramatic is the section of "Practical Rules for Care of the Eyes." Following the French text is the same material in the native tongue.

At the Sixth Congress of the Association of French Industries Against Industrial Accidents, Prof. de Lapersonne, president of the International Association for Prevention of Blindness, spoke forcefully and to the point on prevention of eye injuries in industry, stressing the need for ascertaining the prevalence and type of eye accident, the importance of early and adequate ophthalmological treatment for any eye accident occurring, and the value as preventive measures of eye goggles, screens and veils. The report of this conference is published in the October, 1933, issue of *Protection*, the magazine for industrial safety in France.

How Much Should the Public Know About Venereal Disease?—Social hygiene education is being more generally accepted in all classes and groups of the general public; Dr. Carolyn N. Macdonald, writing in the September issue of the *Illinois Medical Journal*, would take the subject of venereal diseases out of the limbo of sex prudery and into the field of public health. She would tell people of the fact that venereal disease is not the wages of sin but the result of ignorance. The fact that 52 per cent of syphilitic babies who live are handicapped by keratitis, and that babies born to mothers with gonorrheal infection may become blind, should be stressed as consequences of ignorance which is no longer bearable. Frank discussion of the communicability and the methods of cure of venereal disease, with less emphasis upon the moral issue, would lead to greater efforts to eradicate and prevent these diseases.

National Society Notes.—The National Society is pleased to announce some additions and changes on its staff: Mr. Theodore O. Yoder, who has been associated with the American University in Cairo, Egypt, in its prevention of blindness program, and Dr. Anette M. Phelan, instructor in health education at Teachers College, Columbia University, now on leave of absence from the University, are now staff associates. Miss Eleanor P. Brown, formerly secretary, has been appointed an associate director, to

take charge of the special interests of medical social service in eye clinics; Miss Regina E. Schneider now serves as secretary.

Mr. Lewis H. Carris, managing director, presided at the session on "The Eye and Its Relation to Safety," during the annual meeting of the National Safety Council in Chicago; he also participated in the jury to discuss "Is There a Common Objective in Public Health Education Around Which All Health Organizations Can Rally?" at the annual conference of the American Public Health Association in Indianapolis. "Union of Forces to Promote Prevention" was the subject of a paper presented by Mr. Carris at the meeting of the National Rehabilitation Association in Chicago.

Following the impetus given the project of conservation of sight through treatment of syphilitic expectant mothers, at the annual meeting of the American Medical Association, Dr. Park Lewis, vice-president, and Mr. Carris attended a meeting of the Board of Trustees of the Association in Chicago, when plans for complete tests and thorough care of every expectant mother were discussed.

Of importance to sight conservation of the school child were the meetings at which Mrs. Winifred Hathaway, associate director, spoke in Portland, Maine; Washington, D. C.; and Knoxville, Tennessee, on sight-saving class work. In co-operation with New York University, Mrs. Hathaway addressed the class in "Education and Adjustment of Physically Atypical Children" on the phases of education of partially seeing children. She also addressed the class of the National Tuberculosis Association at Teachers College, Columbia University, on "Lighting the Schoolroom."

Invitation has been extended to Mrs. Hathaway to serve on the Committee on Industrial and School Lighting of the Illuminating Engineering Society. Besides its advisory duties in relation to the Illuminating Engineering Society, this Committee is acting as the Secretariat on Industrial and School Lighting for the International Commission on Illumination.

Interest aroused by the distribution of "Suggestions for a Program of Eye Health in a School System" brought an invitation for Miss Mary Emma Smith, R.N., director of nursing activities, to visit schools in North Carolina, to assist in the initiation of an

eye health program in that state. Her survey has taken six weeks and has carried her to all parts of the state.

Miss Brown represented the Society at the National Negro Health Week Conference, in Washington, D. C. She also spoke on sight conservation to students from the health education course of Hunter College, New York City. Both Miss Brown and Mr. David Resnick, director of publicity, continued the long-established co-operation with the radio program of the New York Tuberculosis and Health Association, and presented talks on sight conservation.

Current Articles of Interest

Eyes Down the Fairway, Johnny Farrell, *Golf Illustrated*, July, 1933, published monthly by Golf Illustrated, Inc., New York, N. Y. Good vision does not make good golf, but good golf is impossible without accurate sight. A champion player tells of the handicap of poor vision in golf, and advises the same consideration of eyesight hazards in the game of golf as of any other part of the game. Many good golfers have retrieved a slackening game through correction of vision defects with glasses.

Retinitis of Pregnancy, George W. Vandegrift, M.D., *American Medicine*, August, 1933, published monthly by the American Medical Publishing Company, Inc., New York, N. Y. Although retinitis during pregnancy is fortunately a rare occurrence, its appearance demands prompt recognition and treatment. A case is described, occurring during the last month of gestation, in which forcing labor brought an end to the vision limitation. Ophthalmologists recognize the fact that the vision of the mother is as important to her as her life, and more important than the life of the child. Prompt termination of pregnancy will usually relieve the symptoms if the condition has not persisted.

Transmissibility of Trachoma to Monkeys, L. A. Julianelle, Ph.D., and R. W. Harrison, Ph.D., *American Journal of Ophthalmology*, October, 1933, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. The eyes of monkeys can be infected with the material obtained from swabbing or grattage of trachomatous human eyes, and a resulting follicular conjunctivitis, specific in character, appears within one to two weeks. The probabilities are that the agent is not, as a rule, filterable.

Developmental Myopia and the Treatment of Myopes, John Parsons, M.B., *Lancet*, October 7, 1933, published monthly by the Lancet, Ltd., London, Eng. The author describes five types of myopia—axial myopia, curvature myopia, index myopia, forward displacement of the lens, and a combination of any two or more of these factors. He contends that deviation from the ideal normal

does not in itself constitute a great menace, and shows that for certain types of work a slight degree of myopia may be an asset. He urges, however, optimum working conditions for those with myopia—proper correction with glasses, good lighting, proper working posture and distance, and particular attention to the maintenance of general good health—as precautions to take against the possibility of progression of the defect.

The School that Found Vision, Olive Grace Henderson and Hugh Grant Rowell, M.D., *Child Welfare*, October, 1933, published monthly by the Child Welfare Company, Inc., Washington, D. C. Good lighting and proper posture relieve eyestrain; in a model classroom it was found that simple apparatus and rules contributed to greater eye comfort for the children. Bookracks for reading helped to maintain good posture; study of lighting and improvement of artificial illumination prevented eyestrain from shadow or glare; well-printed books on unglazed paper preclude reflected glare and make seeing easier. All of the efforts to ease eyesight were of such type that they may well be transferred to the home, not only to the children's study hour, but for all the family reading.

The Ocular Conditions in Diabetes Mellitus, W. A. Gray, *British Journal of Ophthalmology*, October, 1933, published monthly by the British Journal of Ophthalmology, Ltd., London, Eng. An ophthalmoscopic examination in diabetes mellitus is helpful in assessing the general condition of the patient; it is valuable for detecting the presence of arteriosclerosis and in foreseeing the approach of coma and determining its degree. In spite of careful treatment, retinitis usually advances and is a frequent cause of failure of vision, while the danger of vitreous hemorrhage is ever present. There seems to be some relation between the progressive deterioration of vision (cataract and retinal hemorrhages) and the presence of sepsis, probably from the ensuing progression of the diabetes.

Conserving the Sight of School Children, Estella Lawes, *Parents and Teachers Magazine*, November, 1933, published monthly by the Federation of Mothers Clubs of Cincinnati and Vicinity, Cincinnati, Ohio. A plea to parents to aid in the conservation of children's sight through recognition of the importance of the cor-

rection of eye defects, by protection from dangerous games and toys; by provision of proper illumination in the home. The theory and practice of sight-saving classes for children with seriously defective vision are outlined.

The Eye in Eclampsia, Gordon M. Bruce, M.D., *American Medicine,* August, 1933, published monthly by the American Medical Publishing Company, Inc., New York, N. Y. In the eye of the toxic mother, we have a useful diagnostic and prognostic aid. Toxic amaurosis is one of the most valuable signs of an impending eclampsia. The retinitis of pregnancy differs in appearance from the retinitis of renal origin, and offers hopeful prognosis.

Trachoma in Egypt, Peter K. Olitsky, M.D., and Joseph R. Tyler, *Archives of Ophthalmology,* October, 1933, published monthly by the American Medical Association, Chicago, Ill. Comparative studies of trachoma, occurring in Egypt and in the United States, have led the authors to the conclusion that Egyptian trachoma is essentially the same disease as that found in the United States, differing in minor aspects only. In studies made both in New York and in Egypt, no other causal factor than the *Bacterium granulosis* of Noguchi was found—a deduction which tends to strengthen further the causal quality of *Bacterium granulosis.*

Metabolism of the Normal and Cataractous Lens, Peter C. Kronfeld, M.D., *American Journal of Ophthalmology,* October, 1933, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. An interesting account of biochemical studies of the lens, normal and cataractous. The author concludes his summary of the study of lens metabolism: "It is impossible to predict at this time how close to an understanding of the cause of cataract we can come with biochemical methods. . . . At this time it looks as though it would be a life-long task for several men if all the trails pointed out by our present knowledge concerning the metabolism of the lens are to be followed."

Sight-Saving Classes in Chicago, Dorothy Hosford, *Seer,* November, 1933, published quarterly by the Pennsylvania Association for the Blind, Inc., Pittsburgh, Pa. A report of the organization of sight-saving classes in Chicago. The author finds significant:

"Although the Board of Education in Chicago has found it necessary to inaugurate a program of the strictest economy . . . not one sight-saving class has been discontinued."

Cataract in the Albino Mouse Resulting from a Deficiency of Vitamin G (B_2), William C. Langston, M.D., Paul L. Day, Ph.D., and K. W. Cosgrove, M.D., *Archives of Ophthalmology*, October, 1933, published monthly by the American Medical Association, Chicago, Ill. When young albino mice were placed on a diet adequate in every respect except a supply of vitamin G, it was found after 43 days that 79 per cent of them developed keratitis, and, after 48 days, 96 per cent developed cataract. Within 50 days, ophthalmia developed in 57 per cent of the cases. From the experiment, it would appear that lack of vitamin G was the sole cause of the keratitis, cataract and ophthalmia.

Conservation of Vision, B. E. Johnson, R.N., *Canadian Nurse,* August, 1933, published monthly by the Canadian Nurses Association, Montreal, Canada. Eye health must be related to general health through their co-ordination in the school health examination. The school period is often most trying for the visual function, since eye application is constant; therefore, school health authorities must give real consideration to problems of school vision testing, to sufficient light in classrooms, and to hygienic measures which insure eye protection.

Etiology of Ocular Disease, Harry S. Gradle, M.D., *Illinois Medical Journal*, September, 1933, published monthly by the Medical Profession of Illinois, Oak Park, Ill. The main causes of ocular disease are as a rule related to general health; and, while the oculist may treat the local condition, he must turn to the internist to discover the remote causes of ocular disease. The close co-operation between general medicine and ophthalmology is an important factor in the prevention of visual deterioration in eye disease.

Book Reviews

Diseases of the Eye. Hofrat Ernst Fuchs. Fifteenth German edition, revised by Maximilian Salzmann and translated by E. V. L. Brown, M.D. Tenth English edition. Philadelphia: J. B. Lippincott Company, 1933. 641 pp. Ill.

The original translation of Fuchs by Duane became so much a part of the armamentarium of the ophthalmologist that one could speak of the "Bible of Ophthalmology" with the knowledge that everyone would understand the reference. The reader could peruse its coarse print to brush up his knowledge of classical pictures. He could revel in his study of the fine print to satisfy his yearning for unusual conceptions and refinements of interpretation. With each succeeding edition, the volume increased in wealth of material and improvement of arrangement. This made later editions a bit unwieldy, but nevertheless dear to the heart of the student.

Since any work, when kept up to date, has an innate tendency to grow more massive, the translator of this new volume found it advisable to delete certain sections. This pruning affected, for the most part, the sections on methods of examination and muscular anomalies. This is a bit unfortunate in view of the fact that, beyond the small work of Lang, we have no source to which to turn, dealing with the technique of our multitudinous procedures; and, again, Duane supplied material on muscular anomalies which he dealt with in his peculiarly attractive manner, not to be found in other works on the subject. He felt so keenly that this section needed elaboration, rather than restriction, that he was preparing a separate volume on the subject at the time of his death.

These remarks should, however, not lead one to feel that the reviewer depreciates in any way the present volume. It will, without doubt, hold a place well in first ranks of ophthalmological literature, and its pages will always glow with a certain familiar touch imparted to it as a descendant of the parent.

The undergraduate will find *Diseases of the Eye* a very essential part of his library, and the established practitioner will find frequent reference to its pages of the greatest material help in his

daily work. One would feel that certain refinements in the manner of presentation of the material on therapeutics would add to the completeness; that the bacteriology, particularly on trachoma, could be elaborated to advantage, and that a classification of certain of the neuroretinal disorders—amaurotic family idiocy, Leber's Disease, etc.—would be helpful in making the book more modern in its conceptions. Of course, this is, in a sense, an unfair criticism of a translation, for naturally the translator is limited by the scope and form of the original.

All in all, the reviewer feels that the work is a real addition to textbook literature, and very much worth while.

John N. Evans, M.D.

An Experimental Investigation of Eye Movements in Learning to Spell Words. Psychological Monographs, No. 196. Luther C. Gilbert. Princeton: Psychological Review Company, 1932. 81 p.

In this experimental study the author has compared the oculomotor and perceptual habits of good and poor spellers, from the third grade of the elementary school through senior high school, by analyzing photographic eye-movement records. At every grade level, the good spellers employed fewer fixations, a shorter study time, briefer and less variable pauses, a broader study unit and fewer regressions than the poorer spellers. The study of spelling appears to be characterized to a large extent by forward progression of fixations across the word, then another cross-passage of fixations, etc., until the word is considered learned. However, this forward progression is interrupted more or less by regressions of various types. Efficient procedure in studying spelling, as represented by the oculomotor habits of the better spellers, was found to vary with maturity. The younger learners tended to explore each word minutely while the more mature students apprehended parts of the word in larger units and tended to concentrate on hard sections. The study habits of poor spellers are the antithesis to that of efficient spellers. The author fails to emphasize the fact that efficient or inefficient oculomotor performance in learning to spell is merely symptomatic of efficient or inefficient central processes of perception.

By means of averages and curves the author has attempted to show growth curves for all the eye-movement measures considered. On the basis of these data rather definite conclusions are drawn concerning the development of oculomotor habits in learning to spell and concerning the implications of these changes. This procedure and the resulting conclusions constitute an unfortunate part of an otherwise commendable piece of research. The conclusions concerning growth in efficiency of the functions concerned are very likely fallacious and misleading for the following reasons: (1) the author has neglected the possible influence of the sampling errors which must be present in his data since only three or four subjects constitute the good or poor group of spellers at each grade level; and (2) he has also failed to consider the influence of selection which, from the middle elementary grades onward, operates to eliminate the inefficient student from school. It is possible and even probable that the growth curves of a single group of individuals, measured on successive years, would reveal different trends from those reported here. The critical reader will await further research for an adequate determination of growth curves in these functions.

The second part of the monograph, which gives an analysis of methods of attack in study procedures and the resulting implications for teaching and remedial work, is a fine contribution and by far the most important part of the investigation. Both the teacher and the research worker will profit by considering the contents of this book, which is a preliminary investigation of real merit in the field.

Miles A. Tinker, Ph.D.

On Some Hereditary Structural Anomalies of the Eye and on the Inheritance of Glaucoma. Julia Bell, M.A., M.R.C.P. The Treasury of Human Inheritance, Volume II, Anomalies and Diseases of the Eye, Nettleship Memorial Volume. London: Cambridge University Press, 1932. Pp. 425–555. Ill.

This work represents a lively interest and inspiration well worthy of a memorial to Edward Nettleship. Ardent investigator of ocular defects in heredity, Nettleship worked out many excellent pedigrees from which he was able to draw important conclusions.

The ophthalmologist and all interested in heredity will appreciate the great value of Dr. Bell's work as a reference source, the subject matter of which has been thoroughly worked up, analyzed, sifted out and brought together to make a unique volume.

Anomalies in the size of the eye—anophthalmos, microphthalmos, megalocornea, buphthalmos, and glaucoma; some anomalies in the development of the iris—aniridia, coloboma of the iris and ectopia lentis are dealt with thoroughly and with thoughtful care as to the accuracy and arrangement of the material selected.

The name index to the chronological bibliography and to the recorders of pedigrees, with descriptions of pedigree plates and illustrative plates—all are complete and essential in the development of our knowledge and study to establish the definiteness and permanency of the laws of inheritance.

Dr. Bell's work in this volume is quite in line with the thought expressed by Nettleship when he said, "The solution of question of heredity depends on the accumulation of masses of reliable statistics based on accurate observations by students the world over."

WEBB W. WEEKS, M.D.

Briefer Comment

TEACHERS' PROBLEMS WITH EXCEPTIONAL CHILDREN. I. BLIND AND PARTIALLY SEEING CHILDREN. Beatrice McLeod. Pamphlet No. 40, Office of Education. Washington: United States Government Printing Office, 1933. 32 p.

Education that prepares for a contributing adult citizenship is the birthright of every child. It is important for the realization of this ideal that the teacher, and particularly the teacher of the rural school, recognize those children whose handicaps prevent fullest appreciation of educational advantages, and that she know how and from what sources she may apply first aid in giving them equalized opportunities with their more fortunate classmates. This pamphlet outlines recognized procedure in dealing with the problems of blind and partially seeing children; suggesting steps in the conservation of vision, symptoms of eye disorder or derangement, methods of testing vision (emphasizing the prime necessity

of vision testing in the kindergarten and first grade), and the methods of educating those with such defective sight that ordinary methods of instruction are impossible, or constitute a danger to remaining sight. Bibliography, pamphlets to be secured at small cost, and periodicals on the special topic are listed with fine regard for the whole field of prevention of blindness and care for the blind. Of great assistance, too, is the list of directors of special education for those states providing for the education of exceptional children.

Industrial Rehabilitation, Sixth Biennial Report of the Industrial Rehabilitation Division, Bulletin No. 17. Madison, Wisconsin: State Board of Vocational Education, 1933. 55 p.

Describing its activities for the reorientation of the physically handicapped person in economic and social life, the Wisconsin Industrial Rehabilitation Division outlines its procedure of employing to the fullest local organizations and institutions in its statewide program. Some of the outstanding cases are presented, showing that physical disability need not preclude successful adjustment to life.

Social Work Year Book. Second Issue. Fred S. Hall, Editor. New York: Russell Sage Foundation, 1933. 680 p.

This second edition of the *Social Work Year Book*, following the general plan of the first reference book on organized social work and related fields, is one-eighth larger, and includes thirty new topical articles. As in the former edition, Part I is devoted to an authoritative record of organized activities, and Part II describes the 836 agencies operating in the social field. The thorough commendations which greeted the appearance of the first edition will again be echoed for the second.

Collected Reprints from the Wilmer Ophthalmological Institute of the Johns Hopkins University and Hospital. Vol. III, January, 1932, to June, 1933. Baltimore: Johns Hopkins University, 1933.

A thoroughly comprehensive library of recent, reprinted articles in ophthalmology, covering many branches of the specialty, and representing the work of many of the well-known ophthalmologists and persons in allied professions.

The Handicapped Child. Report of the Committee on Physically and Mentally Handicapped, White House Conference on Child Health and Protection. New York: The Century Company, 1933. 452 p.

Physically handicapped children—the lame, the blind, the deaf and those sick in body and mind—have a right to a life in which their "handicap casts no shadow, but which is full, day by day, with those things which make it worth while, with comradeship, love, work, play, laughter and tears—a life in which these things bring continually increasing growth, richness, release of energies, joy in achievement." Thus reads the bill of rights for handicapped children; detailed studies in how this ideal may be realized follow in the sections on the Deaf and Hard of Hearing, the Visually Handicapped, the Crippled, as well as on those handicapped with diseases of internal nature, and on the mentally handicapped. The chapter on the Visually Handicapped, of greatest interest to our readers, outlines possibilities for greater expansion of education for those with defective vision, and develops the importance of a working sight conservation program, through preventing blindness from ophthalmia neonatorum, through raising child health standards, through school eye inspections, and through medical and social follow-up of those whose sight or visual faculty is impaired. A selected bibliography suggests sources for fuller studies in this field.

Contributors to This Issue

Dr. Willis S. Knighton, whose contributions have appeared in the SIGHT-SAVING REVIEW from time to time, is a New York City ophthalmologist on the staff of the New York Eye and Ear Infirmary.

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Mrs. Helen B. Jones, who taught one of the first sight-saving classes in Virginia, received her special training at Teachers College, Columbia University; she is supervisor of sight-saving classes in Virginia, on the staff of the Virginia Commission for the Blind.

We are glad to welcome again to our pages **Dr. Philip A. Halper,** who is on the faculty of the University of Illinois College of Medicine and ophthalmologist at the Michael Reese Hospital.

Among the book reviewers: **Dr. John N. Evans** is director of research at the Brooklyn Eye and Ear Hospital; **Dr. Miles A. Tinker** is assistant professor of psychology at the University of Minnesota; **Dr. Webb W. Weeks** is professor of ophthalmology in the New York University and Bellevue Hospital Medical College.

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